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[OFFICIAL NOTICE.]

Annual Meeting, Illinois Gas Association.

ILLINOIS GAS ASSOCIATION,
OFFICE OF THE SECRETARY,
ELGIN, ILLS., FEB. 6, 1911.

To the Members, Illinois Gas Association: The annual meeting of the Illinois Gas Association will be held in the Auditorium Hotel, Chicago, Ills., March 15th and 16th, 1911. The banquet will be held the evening of March 15th.

As soon as the papers, etc., have been decided upon, the information will be forwarded. Yours truly, C. B. STROHN, Secretary.

[OFFICIAL NOTICE.]

Seventh Meeting, Southwestern Electrical and Gas Association.

SOUTHWESTERN ELECTRICAL AND GAS ASSOCIATION,
1316 COMMERCE ST., DALLAS, TEX., Jan. 29, 1911.

To the Members, Southwestern Electrical and Gas Association: At a called meeting of the Advisory and Executive Committees of the Soutwestern Electrical and Gas Association, it was decided to hold the Seventh Annual Convention of the Association in Houston, Tex., April 27, 28 and 29, 1911. D. G. FISHER, Sec'y.

[Special Editorial Correspondence.]

FORTY-FIRST MEETING, NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

YOUNG'S HOTEL, BOSTON, Feb. 15, 1911.

Dear JOURNAL: The other annual meetings of the gas men (and of a certainty these are many) are no doubt worthy and wise, but one may not be held wide of the mark when pointing out the fact that, of them all, in no other body can be seen and enjoyed a greater and more pleasing share of fraternity than is evidenced at these meetings of the New England body, in Young's once each twelvemonth. No undue haste is shown, still everything on the programme is gotten through with; deliberateness is possibly in occasional evidence, yet despite the placidness and the deliberation, nothing on the listing is slighted, and one cannot help feeling at the close of a business session, that everything that should have been done was done, and in such orderly way that no thought of "it might have been done better had it been done otherwise," exists. Well in line with the preceding thought was the transacting at the first day's session of the Mother of them all; whose present session rounds the start of her third successive score period of existence. Think of it, ye who marked her birth, and then consider her record for good in all that lengthy period. Always steadfast to the original motive of its founders the New England Association goes on to the last decade of the half century mark, older and wiser, of course, but to the pleasing accompaniment of the strains that ring the epic of work well done. It is useless to say that Young's was itself this morning or that New England gas men were ready for the call to duty by President W. H. Snow; both facts were as evident to-day as they had been in any of the bygone days. This time, however, every denizen of Boston (peripatetic or otherwise) could congratulate his neighbor on the glorious atmospheric conditions that prevailed. A winter's day, like that immortalized in the verse of the great Lowell, was our portion, and even Secretary Gifford would have been excused had he executed ever so slight a two-step before taking his seat behind the desk he has so well kept free from litter these many years. A truly representative audience heard the call to order. The business of the moment was well kept in touch by President Snow and Secretary Gifford, and it was transacted in about this order. The Directors report disclosed nothing out of the ordinary, unless it be that the accessions to the membership list were fewer than usual, the list calling for the indorsement of 3 in the active and 2 in the associate class. However, this parity of application is nothing other than might be looked for, since the growth in separate gas plants throughout New England is slow, and those already in commission have been represented for years in membership. President Snow's annual message was in keeping with the conditions of the trade. It was congratulatory, with ample reason therefor, in that the record of the trade as a whole in New England for the year was one of continued marked gains in output, of voluntary decrease in rates and of main extensions, which latter brought in sections of territories populated by gas users that 40 years ago were either woodlands or farmlands. Only one danger seemed to threaten, and that was the revolutionary aspect

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that looked rife in certain populous sections, the unthinking in whose connection had put in municipal control at the last fall elections of men who would wrest from their fellows the fair return due the latter from their years of toiling that were far from justly remunerative. The legislative rumblings marked the second bad spot on the horizon. However, the howlers at Lynn and elsewhere have not exercised their insensate attacks to the victory point, and it will be some time, we imagine, before any Massachusetts court would submit to an act putting a rate on a mercantile product that would mean confiscation of the property of those who manufactured it—for certainly the sought for rate of 55 cents per 1,000 in Lynn would be in that category or class. The address having been considered, the reports of Secretary and Treasurer Gifford revealed the solid standing of the Association, with satisfactory bank balance and lengthy membership list to sustain its march through the years. The letters of regret over inability of the writers to be present at the meeting included two rather more noteworthy than the others—one from Mr. W. H. Bradley, of the Consolidated Gas Company, of New York, whose journey Southward was undertaken rather earlier than usual this year; the other from "Fred." Egner, whose failure to report in person was occasioned by a case of influenza, which he properly thought might better be quieted by coaxing than by carping. At this point Secretary Gifford formally called the attention of the Association to the fact that the body had been asked to furnish the projectors of the Engineering Societies' Building for Boston—to be modeled on and carried along quite like that in New York—with the nature of the assistance the Association could give the project in material and moral way. The plan is sure to succeed and on a scale of good magnitude; but when the structure will have been completed, does this mean "Good-bye to Young's" for the New Englander? The first technical matter considered was the composite or joint paper, by Mr. John W. Ellis and Mr. Carroll Miller, respectively President and Engineer of the Providence Gas Company, which comprised a "Statement and the Description of the New Coal Gas Works" of that Company. The whole story thereof was graphically narrated by the authors, and we all expect to-morrow to inspect the plant, at the special invitation of President Ellis. In the discussion which followed not the least interesting section was that from Mr. Africa, who recounted at length that which his Company in Manchester, N. H., had been doing along the line of "Verticals." Next in order was a paper on "Sign and Special Lighting by Gas," prepared by Mr. Wm. S. Farrow, of the Cambridge Gas Light Company. This, if we mistake not, is really an original topic, so far as gas association work in this country is concerned, and Mr. Farrow's presentation will be closely read by the gas men at large, although it received scant consideration so far as discussion went to-day. This number brought the luncheon hour adjournment.

The afternoon session was begun at promptly 2:30, and the first thing considered was the paper by Mr. Edward Page, of Boston, whose sequential story was rewarded by a brisk discussion. The Page presentation was followed by the report of the Nominating Committee. The office bearers recommended were these:

For President—John A. Coffin.
For First Vice-President—D. D. Barnum.
For Second Vice-President.—T. H. Hintze.
For Secretary and Treasurer.—N. W. Gifford.
For Board of Directors.—C. A. Learned, H. K. Morrison, J. F. Wing and J. Arnold Norcross.

It is needless to add that the committee's namings were unanimously indorsed, and not a man present in that assemblage, representing as it did the veriest flower of New England's fraternity of gas men, who did not feel honored in welcoming to the chief office of the Association that kindliest man of all New England—beloved "Johnnie" Coffin. No matter what may come to him in the future, as to his active kinship with the industry, time never can efface him from the mental recordings of his fellows or loosen the ties of closest fellowship that ever bound men to men. A try at the question box resulted in a spirited set of dialogues, which brought the meeting well beyond the hour for adjournment. The two questions that caused the debate to assume almost undue length were those related to the merits of fan and pressure blowers and in respect of tar for road making. The latter practice gains ground steadily in New England.

The informal discussion also included a topic for debate that had to do with the merits of district governors in high and low pressure distribution, and the part taken therein by Mr. Arthur Lloyd, of Detroit, was especially noteworthy.

The banquet, as usual, was set in the same old room in Young's, and while old times were vividly renewed during the course of the excellent service, there was enough of modern leaven mixed in to cause a happy blending of old and new. President Snow directed the affairs from the Toastmaster's box, and his calls for eloquence fell upon those whose tongues gave voice to thought, and whose expression oft gave rise to merriment. As is usual on such occasions, our own man from Lynn (the silent, thoughtful, successful Mr. Prichard), compelled attention, and so did that Premier of Philadelphians, smooth and convincing John J. Gribbel. "Al." Eaton (completely recovered from his serious illness of a year or more ago, was as unctuously humorous as ever. But the balm of it all was laid on by the Gloucester man—President-elect Coffin, whose prescience was such as to lead him to proclaim that the coming year would be the greatest year in the Association's useful history. So may it be, was voiced by all; but somebody will be kept busy to attain that rating. Members and guests to the number of 100 shared in the feast.—C. H. W.

The second day's proceedings were started at 10 A.M. promptly, and the attendance warrants the statement that banquets seem not to interfere in any sense with the work which New Englanders map out. To hark back, I should have written yesterday that President Snow positively declined a re election to the office of chief executive. The first number in order was the paper by Mr. W. H. Kelly, of Waltham, Mass., which dealt with "Gas Arc Street Lighting," which not only maintains its place in New England, but steadily grows in favor. Then Mr. B. P. Bill, of Springfield, very interestingly detailed some "Effects on Distribution System at Springfield of Break in Water Main." The vagaries of such happenings often tax the ingenuity of the engineer, and the Springfield case was one that put forth many queer phases. The paper list proper was ended by a tersely told system of "Consumers' Equipment Inspection," as followed in Concord, N. H., by Mr. H. K. Morrison. The Concord plan seems well calculated to bring about harmonious relations between the consumer and the Company. The question-box and the "topics" were here considered to a finality, the "topic" that attracted most attention being the one concerned with automatic street lighting. This brought us to the start of the trip to Providence for an inspection of the handsome, in every sense satisfactory, installation of verticals, which stand as positive evidences of the modernism of the Ellis methods, to the skill of Mr. Fred. Mayer as a designer, and to the competency of the huge Didier-March Company as constructors. And here is where our disappointment came in. The party boarded special cars attached to the New York flyer, leaving Boston at 1:03, and the run to Providence was made on schedule time. There a special train of three cars was in waiting to convey us to Sassafras Point. But, as is often the case with "best laid plans," at the moment when all seemed moving smoothest, a "freight ahead" managed to mangle itself sufficiently to block the party for three hours. It was almost 5 P.M. when the works were reached, and, to tell the truth, the condenser house, with its well provided, well served luncheon, was enjoyed before the hurried inspection was made. Although the "shades of night were falling fast," a hurried inspection of the beautiful plant was made under the able guidance of Mr. Carroll Miller, Mr. Ellis's capable and well-liked aide. It was really more than annoying that the contretemps prevented a proper inspection of the plant. However, perhaps some amend may be made through the story respecting it that will be given you shortly. It was nightfall when the cars were again boarded, and when another eventful meeting of the New England Association was declared adjourned.—C. H. W.

Publications.

Gas World Analyses of Municipal Gas Undertakings.—The undertakings considered number 73, and the figures will undoubtedly receive considerable attention from those in the management and accounting ends.

National Commercial Gas Association, Monthly Bulletin.—Six by 9; 20 pp.; illustrated. Furnished to members. The "Bulletin" comes out under a new cover, has been increased in size and contains much of interest in the commercial field.

Gas Arc.—Issued monthly by the General Gas Light Company, Kalamazoo, Mich. Six by 9; 12 pp.; illustrated. This non-technical bulletin contains some handsome cuts of the Boston gas show, and many items which, while not germane, are more or less interesting.

[Official Report—As Approved by Committee on Publication.—Continued from Page 312.]

THE FIFTH ANNUAL MEETING, AMERICAN GAS INSTITUTE.

Held in New York City, October 19th to 21st (Inclusive), 1910

Second Day—Afternoon Session.

PNEUMATIC CAULKING WITH LEAD WOOL OF 30, 36 AND 48-INCH MAINS—*Continued.*

We finally placed an order for one of the Abenaque-Ingersoll-Rand type (No. 1 on the table) and one National Brake and Electric Company outfit (No. 6 on the table). The Abenaque-Ingersoll outfit is shown in Fig. 3, and the National Brake and Electric in Fig. 4. It will be noted that these two outfits are radically different, our idea being to try out both types and adopt the more successful of the two for future installations. The hammer adopted was the Ingersoll-Rand "Crown," chipping hammer, having a piston stroke of 3 inches. With a gang of 8 caulkers working it is necessary to have 10 of these tools. Then, if a caulker has any difficulty with his hammer he is given one of the spare tools and the trouble, usually nothing serious, can be remedied by either the foreman caulker or the compressor engineer. Fig. 5 shows two of these hammer and some of the experimental tools, the three on the right hand side being those finally adopted.

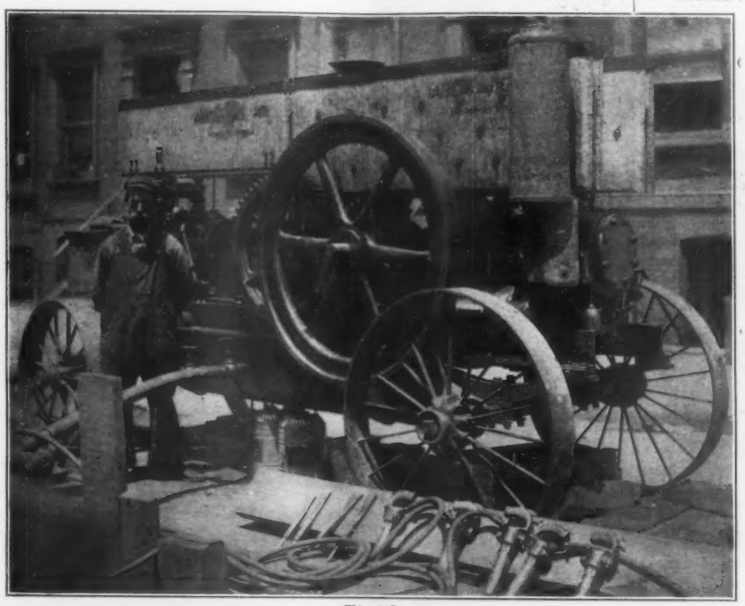


Fig. 3.

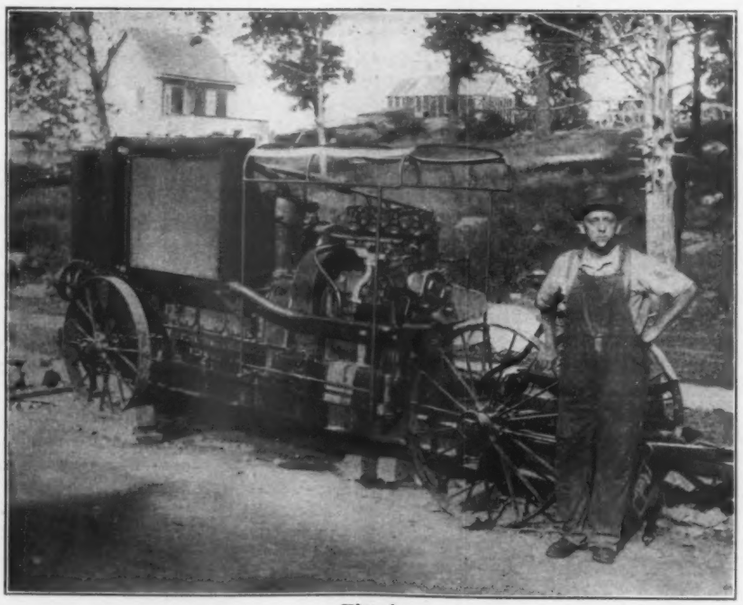


Fig. 4.

We had some little trouble at first with these hammers, due no doubt to the lack of experience on the part of the men handling them. The barrels became loose after working for an hour or so, allowing some of the air to escape, and several of the handle bolts snapped off. We were unable to find the reason for this ourselves and complained to the manufacturer. An expert was sent up on the work from the factory to investigate, and reported as follows:

"I found four hammers at work on the job, all with loose handles, which, from watching the operators, I am satisfied was caused by failure of the men to hold the hammers up hard against the tool while working. This caused the piston to strike the front end of the hammer, which resulted in the shock being transferred to the thread on cylinder and handle, thus causing an expansion of the handle.

"Relative to the breakage of bolts, I removed the bolts that were in the hammer and replaced them with nickel-steel bolts, brought by me from the shop for this purpose, and by placing the lock washer under the head of the bolt instead of under the nut, I found that it gave the desired results; *i. e.*, a tight handle, as, after watching the tools for 3 hours longer in actual service, I found that none of the handles come loose.

"The split handle complained of was the result of the same cause, inasmuch as the constant jarring had split the handle and the constant tightening of the bolt under the split handle caused it to spread. I would recommend that these broken handles be replaced and will endeavor, on future orders for this Company, to supply the handle bolts of the kind I have used with lock washers under head and nut."

Very little difficulty of this kind has since been experienced with the hammers. Their work has been quite satisfactory and the troubles we do have can generally be traced back to a green or inexperienced caulker. The yarning and caulking sets were forged by our own blacksmith, from a special 1 inch octagonal steel tool blank 11 incnes long. Fig. 1 shows the shape and dimensions of the tools used on the different sizes of pipe. These tools are the product of quite some experimenting with different shapes and sizes, and give excellent results. As different joints of any size of pipe vary considerably in width, it is necessary to have several caulking sets with different thicknesses of face to meet these conditions. The broad-faced finishing tool is only used in facing off the last strand of lead wool.

Where it was possible to place the compressor alongside the trench near the joints to be caulked, the tool hoses were all run from a manifold tee. This manifold was in turn connected to the air receiver by a 3-inch rubber hose. That plan is much more satisfactory than running along, wrought iron pipe line, the friction and air leakage losses being reduced to a minimum. Of course, there were cases where it was impossible for the compressor to stand alongside the trench, and the wrought iron line consequently had to be run. Figs. 6 and 7 give a very good idea of the manifold and rubber hose connections.

The first gang of compressed air caulkers was started on a 48-inch line. The men were allowed to go along slowly at first, until they became accustomed to the work, and no cost figures were kept for 2 or 3 weeks. A certain amount of trouble was anticipated at the start, as men of this class are naturally opposed to anything tending to reduce hand labor and will try in their own quiet way to do what they can to "Beat the game," and they did, for a short time.

As first organized, the gang consisted of 9 caulkers, 8 of them working in pairs, 1 acting as foreman, his duties being to assign the men to their joints and to inspect the finished work. There were also 2 laborers rolling the lead wool for the caulkers and a compressor engineer. After several weeks' work with this organization, a cost report (given in detail below) was turned in. This report covered the last 3 days only of the third week's work:

[1]Number of joints yarned and caulked	19
Caulkers, at 30 cents per hour	$91.00

1. All yarning done by hand.

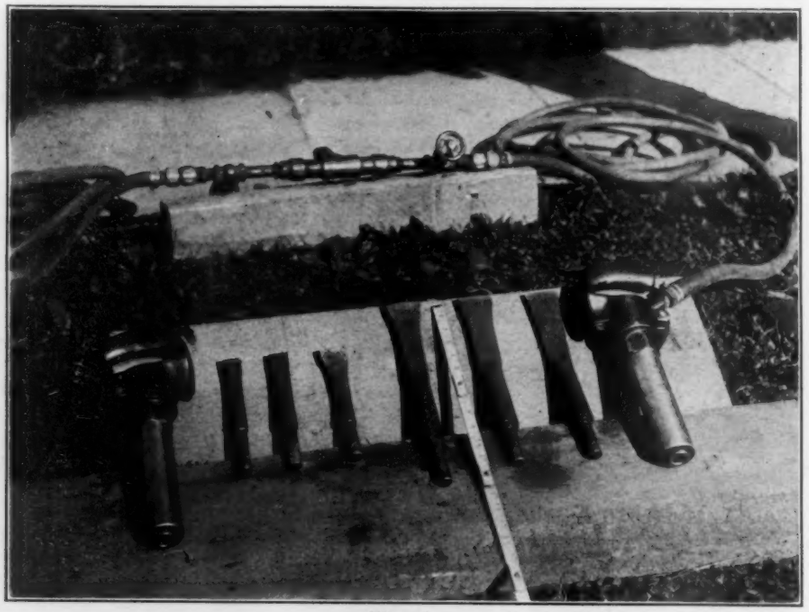


Fig. 5.

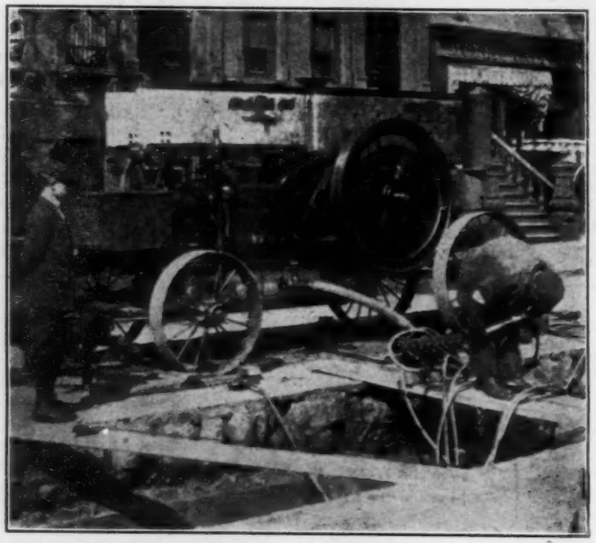


Fig. 6.

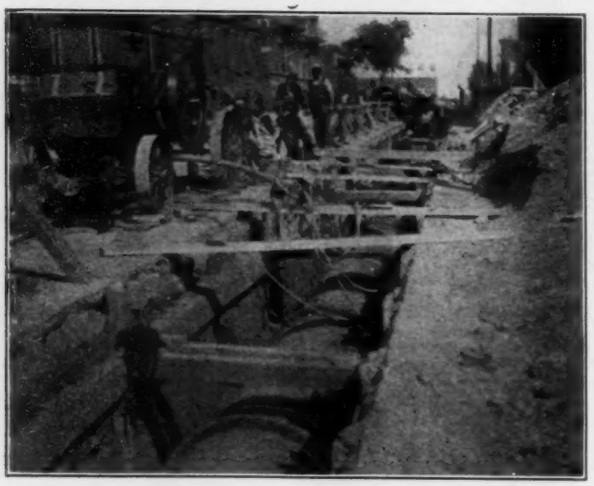


Fig. 7.

Laborers, rolling lead wool at 19 cents per hour..	$11.40
Compressor engineer at 30 cents per hour.....	9.00
Total labor cost.....	$110.40
Gasoline, 29 gallons at 1 cents.....	$3.19
Lubricating oil, ½ gallon at 50 cents.....	.25
Repairs and renewals.....	
Total cost.....	$113.84
Cost per joint.....	5.99

Average time taken to yarn and caulk joint..... 6 hours.

To this figure must be added a depreciation charge, on the plant in use, of about 30 cents per joint. This is, of course, a very hard figure to determine absolutely. If we take the cost of the plant complete as $1,900, and figure that it will last for 6 years, and average 1,000 joints per year, the depreciation cost per joint will be as stated above. Adding this 30 cents, gives us a total cost per joint of $6.29. To complete 19 joints in 3 days by hand, would mean a gang of 12 caulkers and a foreman, with some overtime. The cost per joint would figure as follows:

380 hours caulkers at 30 cents.....	$114.00
60 hours laborers rolling lead wool at 19 cents.....	11.40
32 hours foreman at 30 cents.....	9.60
Total cost.....	$135.00
Cost per joint (hand).....	$7.11
Cost per joint (air).....	6.29
Saving air over hand, per joint.....	.82

While there was an actual saving of 82 cents per joint, it was nothing like the result we had expected, and it was decided to observe the work more carefully to see whether it was not possible to cut the cost still further. A little personal investigation developed the following points:

The foreman being a caulker himself, and naturally in sympathy with his men and their desire to "beat the game," was making no attempt to push the work and had finally established a rule that 1 hammer to each pair of caulkers was all that was necessary. Consequently, one man remained idle while the other caulked his side of the joint.

The men rolling lead wool worked fast enough only to keep the caulkers supplied and stopped whenever there was no caulking going on. As a matter of fact, 1 able-bodied boy could have rolled in a day enough wool to keep the gang supplied for a week. Then the yarning was being done by hand, making the cost of yarning a joint actually greater than that of caulking it.

It was quite apparent that the whole proposition was one of system. Pneumatic caulking is much quicker and easier than hand work. Keep the caulkers busy all the time, with their work laid out intelligently in advance; have the tools, yarn and lead always at hand, so that it is unnecessary for a man to leave the trench, and the result will be a considerable saving both in money and time.

As a result of this investigation, the force was reorganized according to the following scheme: A foreman, not "one of the gang," was placed in entire charge of the caulking and given to understand that his job depended on his ability to push the men and reduce the time per joint. He was furnished with blank reports, and instructed to forward one properly filled out each night to the main office. This report served two purposes: It allowed the work to be followed very closely by the interested parties at headquarters, and also caused the men themselves to brace up, knowing that their individual results were being watched. We were also able to keep better informed about the compressors and tools, and to compare the result obtained with different types. The report was, of course, checked up by the field engineer before being turned in, and he was able to tell at a glance whether any time was being wasted.

It was decided at this time to yarn all joints by air. This proved quite successful, the yarning time being cut from 2 hours 15 minutes to as low as 30 minutes. The lead rolling force was cut to 1 man, who was sent away from the work to the storeroom and kept busy whether the caulkers were working or not. Still another improvement was made by providing the gang with a laborer acting as a tool man. Quite a lot of time had formerly been wasted by the men in running around looking for tools. The average caulker, when looking for anything, with the possible exception of a fight, has about as hard a time finding it as our well-known friend Diogenes. When

tools were needed it was up to the tool man to provide them, enough spare hammers being kept in reserve to immediately replace any needing repairs or adjustment. The caulkers were under no circumstances allowed to leave the trench during working hours. With these changes, the gang made a fresh start and the results shown by the next cost report turned in were more than gratifying.

The conditions under which the work covered by this report was done were unusually severe. The joints were all in a loose-rock trench, running through very low ground, the presence of salt water making it impossible to caulk at high tide. The cost per joint would naturally be higher under these conditions, for a certain amount of time were lost in shifting the whole gang to another part of the work when driven out by the water. The greater speed possible with pneumatic caulking was especially valuable to us here, as we were able to complete a whole joint between tides instead of having to leave it when partly completed, then come back next day to clean out the mud before being able to continue.

Following is an abstract from the cost report:

Total number of joints yarned and caulked	39
All labor charges (caulkers, foreman, toolman, leadman and compressor engineer)	$189.46
Gasoline, oil and repairs	5.44
Total cost, 39 joints	$194.90
Cost per joint	5.00
Plus depreciation on plant, per joint	0.30
Total cost per joint	$5.30

This cost would undoubtedly have been lower still, but for the fact that half of our hammers had been sent to the Ingersoll-Rand repair shop to be fitted with lock nuts and washers, as recommended by their expert. It would not be quite fair to compare this cost per joint with the cost of hand caulking in a dry trench. If it requires 10 hours for 2 men to yarn and caulk a 48-inch joint under normal conditions, it would certainly take 12 hours to do the same amount of work in a tidewater trench. On this basis, the cost per joint would have been as follows:

Two caulkers, 12 hours each at 30 cents per hour	$7.20
Labor rolling lead (per joint)	0.30
Foreman caulker (per joint)	0.40
Total cost per joint, hand caulking	$7.90

There was, therefore, a saving of $2.60 per joint, or about 33 per cent. The daily cost reports, to date on this particular line, have checked this figure very closely, the saving of air over hand work averaging about 30 per cent.

On the line in question there were, roughly, 750 joints. Taking the average cost per hand caulked joint as $7.11, the total cost of hand caulking would have been $5,332.50. The total saving, using air tools, would, therefore, be very cloce to $1,600, so that the outfit will practically pay for itself in the first season's work.

These figures are quite conservative. While the weather conditions were ideal quite a little time was lost in shifting the compressor around, as pipe was being laid at two different points on the line, and it was never possible to have a straight run to caulk of more than 300 feet. There were also days when there was no pipe ready for caulking. When this condition arose, the foreman and compressor engineer overhauled and cleaned the compressor and the air hammers, and the caulkers were put to work as laborers.

The ability to caulk several joints quickly proved of great value on this line, in allowing some rather bad street intersections to be finished up and back-filled with the least possible delay. While the money value of such a saving would be rather hard to compute, it must be quite an item when we consider the maintenance of intersecting pipes and sewers, sheeting, shoring, temporary bridges, night and-day watchmen, and the ever present possibility of accidents to vehicles and pedestrians while the street is open.

We were quite pleased to find we were able to get from 10 to 15 per cent. more lead wool into these joints by means of the pneumatic tools than we had previously been able to get by hand. This proved conclusively that pneumatic caulking gives a more compact, consequently a more nearly gas tight joint than the old method.

The second compressor to arrive was the National Brake and Electric outfit. This was placed on a 36-inch line and, after spending some time breaking in the caulkers, a gang was organized along the ideas described above. The same difficulties were experienced at first. A few tools were broken, and the compressor stopped unexpectedly a few times, but finally things were licked into shape and we began to get results. The compressor on this line was larger than that on the 48-inch, and it gave excellent service drilling rock, at the same time running enough hammers to keep all the caulkers busy. At the present writing there has been more rock drilling on this line than caulking, so there is still room for improvement in the cost figures. This will, undoubtedly, come with practice and systematization of the work. Taking an average daily report from this line, the cost per joint figures as follows:

[1]Total labor and compressor cost	$17.75
No. joints yarned and caulked	9.60
Cost per joint	1.85
Plus depreciation on outfit, per joint	0.30
Total cost per joint	$2.15

Also 41 feet of 1-inch hole, drilled at a cost of 21 cents per foot.

The cost of hand caulking per joint would have been as follows: To do nine 36-inch joints a day would take a gang of 10 hand caulkers at an average rate of $2.75 per day. A pair of good hand caulkers can do two joints in a 10-hour day, but the average will be a little less than that. No time for a foreman caulker is charged, as the pipe foreman on this line looks after the caulking and, for a given number of joints, his time would be the same for both compressed air and hand work:

10 caulkers at $2.75	$27.50
Labor rolling lead	1.00
Total cost, 9 joints	$28.50
Cost per joint	$3.17

This gives a saving per joint in favor of compressed air caulking of $1.02, or about 32 per cent.—very close to the average percentage of saving on the 48-inch work. It will undoubtedly be possible to cut the cost per joint on the air work still further when it is not necessary to drill rock and caulk at the same time. The drills use a large amount of air and make it impossible to run more than 6 caulking hammers. The compressor can easily run double that number, and the fixed charge per joint (which is a fair sized item) could, therefore, be cut in half. The caulkers will also in time become more expert, thus increasing the number of joints per day. The working conditions on this line were not as severe as on the 48-inch previously described, but when we stop to consider that more than half the caulkers were absolutely green (not even having a hand caulker's experience), the results are very encouraging. Caulkers are not always numerous in New York City, and if it is possible to break in absolutely green men as quickly and satisfactorily as this, our troubles are ended in this direction.

The compressor outfit furnished by the National Brake and Electric Company proved quite satisfactory. A $2 per day laborer, who had never seen a gasoline engine before, was able to run it without any trouble, and the repairs cost next to nothing. The only possible objection to this outfit was the inability to move it readily on account of its weight. We expect to purchase a smaller outfit of this type of ½ the air capacity and about ½ of the weight to be used for caulking. The larger compressor will then be used exclusively for rock drilling where it is not necessary to make as many shifts.

It might be well to add that a compressor need not be looked upon as a dead loss during the winter months, or when no outside work is in progress. There are many ways in which compressor air tools can be used to advantage on repair jobs around the works, and the testing of long stretches of main becomes an easy matter with a ready supply of air at any required pressure always at hand.

We were so well pleased with the results on the 48-inch and 36-inch lines that a third compressor outfit, of the Ingersoll-Rand-Abenaque type was ordered for use on the 30-inch work. This compressor, unfortunately, arrived a little behind schedule and we were only able to use it for 2 weeks when the work was temporarily suspended on account of a delayed shipment of pipe. The results obtained in these 2 weeks were quite promising though, and with very little practice a pair of caulkers would be able to do 5 joints per day, as against 2 by hand. This would give a saving of about 30 per cent. and possibly better, as the working conditions here are ideal. The caulking gang was organized on the same basis as that described for the 48-inch line, and past experience enabled us to eliminate most of the troublesome features.

The average air pressure carried on the receiver gauge was about

1. On this work we were able to obtain caulkers at an average of $2.50 per day, as against $3 on the 48-inch line

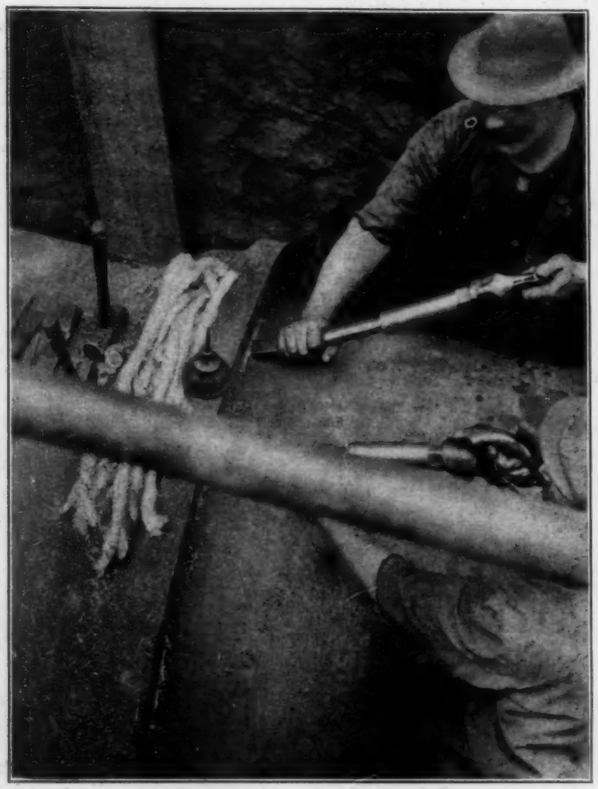


Fig. 8.

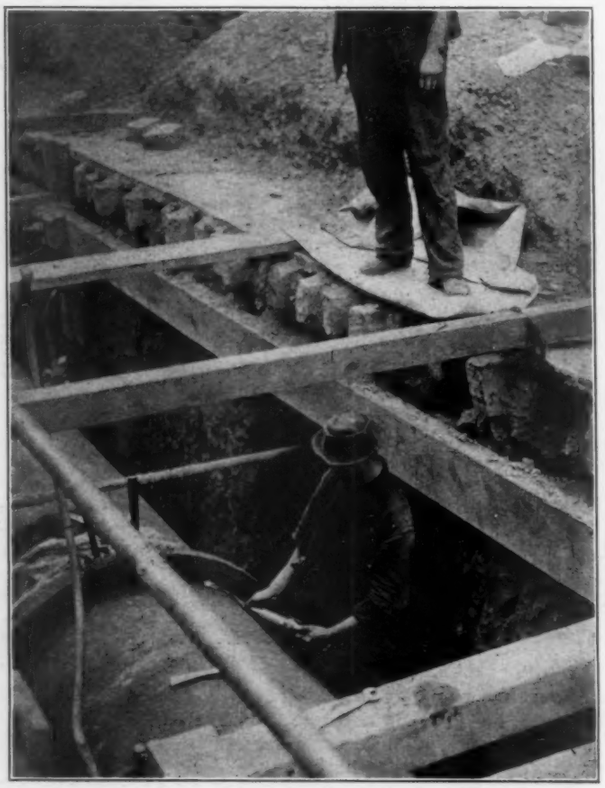


Fig. 9.

FIG. 10.—DAILY REPORT.—COMPRESSED AIR CAULKING.

48th–134th St. Line. Type of compressor, Ingersoll-Rand-Abenaque. Type of hammers, Ingersoll-Rand. Weather, fair morning; showers afternoon. Date, Aug. 9, 1910.

Name.	Grade.	Rate.	Total Hours Worked.	Number of Joints Caulked.	Joint Number.	Time of Yarning.	Time of Caulking.	Total Time for Joint.	Weight of Yarn, Pounds.	Weight of Lead, Pounds.	Time on Work other than Compressed Air Caulking. State Nature of Work.	Compressor.				Hammers.			Remarks.
												Total Hours Running.	Gals. Gasoline Used	Quarts Lub. Oil Used.	Repairs.	Total Number on Hand.	No. in Use.	Repairs.	
E. Guiry	Caulker	$3.00	10	2	1	50′	2:45	3:35	13½	157	All	7:10	8	1	None	8	7	None	Delayed
D. Mahoney	Caulker	3.00	10		2	50′	2:55	3:45	14½	160	hands								1 hour 50
T. Dillon	Caulker	3.00	10	2	1	50′	2:55	3:45	14½	158	made								minutes
D. Cregan	Caulker	3.00	10		2	45′	2:50	3:35	14	158	300′								waiting
C. Gruber	Caulker	3.00	10	2	1	45′	2:45	3:30	13	143	shift								for joint
H. Daniels	Caulker	3.00	10		2	45′	2:45	3:30	13¾	155	with								holes to
B. Costello	Caulker	3.00	10	2	1	45′	2:50	3:35	14½	166	com-								be dug.
F. Hogan	Caulker	3.00	10		2	50′	2:50	3:40	14	168	pressor								Also de-
T. Skelley	Foreman Caulker	3.00	10																layed ½ hour by
S. Salt	Comp. Engineer	3.00	10																pay mas-
M. Cunningham	Tool man.	1.90	10																ter's
Labor rolling lead wool		2.56																	wagon.
Total		$34.46		8															

Total labor and compressor cost (compressed air caulking only), $35.36. Total number of joints (compressed air caulking only), 8. Average cost per joint, $4.42 + depreciation, .30 = $4.72. Hand, $7.11. Saving, $2.39, or 33 per cent.—G. A. SHERRON, Field Engineer.

70 pounds. This gave from 50 to 65 pounds pressure at the tool and was found quite sufficient. The compressors were all fitted with unloaders, which, when set for any given pressure, regulated the air supply automatically. From the results obtained on these 3 lines, it would certainly seem that pneumatic caulking of lead wool joints gives better and quicker work with a considerable saving in cost. The caulkers themselves are better satisfied, as their work is much easier and it takes considerably less time to break in a man as a pneumatic caulker than it does to get him in shape to swing a 3½-pound hammer for 10 hours. As I have stated before, the supply of caulkers in New York city is not always equal to the demand.

Discussion.

The President—Gentlemen, there are three written discussions on Mr. Simpson's paper. As some of the authors of these are not present, Mr. Earnshaw will read the discussions.

Mr. Earnshaw—This is a discussion by Mr. J. D. Von Maur, of St. Louis: I have read Mr. Simpson's paper with a great deal of interest. A number of years ago we experimented in St. Louis with pneumatic caulking in laying our 24-inch high pressure lines, using cast lead for making the joints. We did not find the result satisfactory, either from a cost standpoint or the character of the work obtained. The reasons were substantially as stated in Mr. Simpson's paper. The best results with hand caulking, using cast lead, are obtained by using light sledge-hammers for caulking instead of the ordinary caulker's hammer. The work is not only better, but the joint is completed in considerably less time. With the use of lead wool, however, the proposition is entirely changed. Here we have a

material which, from its nature, involves a great deal of labor to caulk the joint satisfactorily. The hand labor cost is increased very greatly, and Mr. Simpson has demonstrated that, where there is sufficient work to warrant the purchase of a plant, this labor can be done at a reasonable expense, and undoubtedly gives a very much tighter joint than could possibly be obtained by either cast lead or cement. I would like to ask Mr. Simpson under what gas pressure these cast iron mains are tested and operated, and whether any of the joints leaked on the test made after the joints were caulked; also, have any of the joints leaked in actual operation? It is, of course, understood that these joints are very much tighter and remain so, than where the joints are made with cast lead; otherwise there would have been no object in going to the greater cost of using the lead wool. In St. Louis all our mains are laid, using Portland cement for joint caulking purposes. For joints 12 inches and under there is absolutely no question as to the value of cement for this purpose with 5 pounds operating pressure. The idea that mains laid with all cement joints have a tendency to break has not been borne out in our practice, as we have not had a single main broken from this cause out of a total of several hundred miles. We also laid a 30-inch cast iron main, with cement joints, which is operated under low pressure, and although this main has been in use for several years we have never had any leaking joints on it, but with the 24-inch mains, which are operated under 5 pounds pressure, we have had considerable difficulty, yet I am satisfied that these mains can be laid, using cement for the joints, which will remain absolutely tight. My reason for so believing is the fact that we have many long stretches where no leaks have occurred. If it is possible to lay one stretch of main which will remain tight it would seem that mains, laid in precisely the same manner, and under the same conditions, should also remain tight. Unfortunately we stopped using Dyckerhoff cement and substituted a local Portland cement, which is one of the best in the market for ordinary purposes, but gave us considerable trouble when used for joints. The great trouble with using cement is the fact that it may test very well when laid, but may leak after 6 months or a year. Most of our joints were absolutely tight at 30 pounds pressure 24 hours after they were laid, yet these same joints leaked after being in the ground 6 months. This illustrates the danger of experimenting on a large scale with cement, especially in a large city, where the cost of repairing joints is very great. The difference in cost of using cement and lead wool, however, is so great that it would seem that the large gas companies should carry on the work of experimentation until it is definitely decided at what size main the use of cement is no longer economical. But where it is decided to use lead wool on a large scale the caulking should certainly be done with pneumatic tools, otherwise the labor is well-nigh prohibitive. All gas men having to lay large size mains will certainly appreciate Mr. Simpson's paper on this practical question, and the full details will be a guide for anyone planning future work.

Mr. Earnshaw then read the following written discussion by Mr. A. H. Hall:

Mr. Simpson has prepared a paper which will prove of value to every member of the Institute who is connected with the street main department of a company. The only form of discussion which suggests itself to me is one which lays emphasis on the difficulties encountered, so that they may be avoided in future operations. In his first paragraph Mr. Simpson gives two main reasons for the failure of the earlier experiments of the Consolidated Gas Company. Neither of these to my mind gives the real reason. The first of these, the well-known fact that cast lead cannot be compressed by caulking for more than ¼ inch to ¾ inch back from the face of the joint, applies with equal force to hand work. The second reason is also fallacious, as the time could have been reduced had the proper tools been used, in practically the same proportion with cast lead joints, as with those in which lead wool is the medium. In the Central Union Gas Company we first started to caulk with pneumatic hammers, in 1904. The Company had purchased a portable gas engine, air compressor outfit for use in rock drilling, the argument being that a gas engine was a better advertisement for a gas company than a steam boiler. This plant was first used on a 24-inch line in which cast lead was used for the joint making material. After the outfit had proved a success at rock drilling, we experimented with it for caulking. We asked the hammer manufacturer to give us pneumatic tools which would strike a blow equal to that struck by a man using a 3½ pound hammer, and made our caulking tools of the same width and depth of face as we had been using in hand work. This trial was an absolute failure; first, because the hammer was too heavy to be handled in the trench; second, because the very rapid movement of the piston made it impossible to deliver less than 7 or 8 blows of 3½ pounds force at each setting of the tool against the face of the joint; third, the caulker didn't want it to work. In our next trial we used a hammer of about half the size and increased the width of the face of the tool to about 2½ inches. The labor question we solved by giving the hammer to a bright Italian laborer, with the promise of an increase from $1.50 to $1.75 per day "if he made it work." After a little practice this man turned out very satisfactory work, and did twice as many joints per day as the hand caulkers. Mr. Simpson has been rather unfair to the pneumatic system in his method of charging depreciation. If 30 cents per joint is the correct figure when the outfit is being operated at the rate of 19 joints in 3 days, or 6⅓ joints per day, it is manifestly too high, when 8 joints, or 9⅔ joints, are finished per day. This is particularly true of the latter case where the machine is credited with rock work to the value of (41 feet + 0.21c.) $8.61 on the same day. The estimated figures for hand labor also seem too low if worked out on the same assumptions as were used in the case of the 48-inch work. In the latter case it was assumed that 2 caulkers could finish one 48-inch joint per day of 10 hours. Working at the same rate they should finish one 36-inch joint in ¾ of a day (7½ hours) or each 36-inch joint would require 15 hours' labor. On this basis the estimated cost would work out as follows—the caulkers being charged at 30 cents for comparative purposes:

9 joints at 15 hours per joint; 135 at 30 cents	$40.50
Labor rolling lead	1.00
	$41.50
Cost per joint	4.61

which would show a saving of $2.46 per joint or about 53 per cent. There seems to me one point to which Mr. Simpson might have drawn greater attention, and in the light of the modern humane practice of bettering laboring conditions wherever possible, it is of undoubted importance. In caulking any kind of a lead joint in a trench by hand, the men wielding the hammers work under extremely hard conditions. The positions in which they must place themselves in order to properly address their work are almost always cramped and uncomfortable. I have frequently seen caulkers lying on the pipe to caulk the underside of a joint when the iron was so hot, from exposure to the sun, as to be almost too warm for me to bear my hand on. In caulking sizes larger that 12-inch it is necessary for 2 men to work at the underside of the joint. They lie on their backs in the bell hole, and one man holds the caulking tool against the lead while his mate strikes it with his hammer. It is very difficult for a man who is not ambidextrous to caulk both sides of a large joint. All these conditions make the work of a hand caulker very trying, and although the pneumatic hammer does not take him out of the trench, it does help him to do his work with a smaller expenditure of muscular effort.

The President—Is Mr. Walton Forstall present?

Mr. Walton Forstall—I was not sure that I would be here, so I put my remarks in writing. Some of the points have been made by some of the other members in their discussion. I am glad to be asked to discuss this paper of Mr. Simpson's, first, because joint making is one of the most important distribution problems; and, second, because I had the pleasure this summer, under Mr. Simpson's guidance, of seeing pneumatic caulking of 48-inch joints. Anyone who has had to do with large mains under expensive paving, realizes that a method of joint making, which produces not only tight joints, but joints that *stay* tight, may greatly exceed in first cost a cheaper method, and yet in the long run prove more economical than the cheaper method, if the latter results in many leaky joints year by-year. This undoubtedly is particularly true where the main in question is a 48-inch and the city New York. Therefore, I consider that, without the actual saving Mr. Simpson has shown for pneumatic caulking over hand caulking, it would still have strong claims for consideration under his conditions. I say this because I believe that pneumatic caulking renders much more certain the uniform and proper compression of the lead wool. Right here, however, I wish to say that my experience with lead wool has been very limited. Such as it is, it has left me with the impression that, when using lead wool, more attention must be paid to the caulker and his work than is true of cast lead joints. This for the reason that the only justification, for the extra first cost of a lead wool joint over one of cast lead, lies in the fact apparently pretty well demonstrated that it is possible for this extra first cost to secure a joint that stays tight. This permanent tightness

results only if the lead wool is properly caulked, in which case a joint of about the same density as the ½ inch or ¾ inch of the compressed layer of cast lead is secured for the *whole* depth of the lead wool joint. This subject does not appeal to the small gas works, but the large cities should keep in touch with this matter, as further experience may show that pneumatic caulking pays in sizes as small as 20-inch. The Technical Committee should obtain next year a further contribution from Mr. Simpson, giving another year's experience. If a record is available, showing the percentage of leaking joints found each year, to the total joints in service, divided as between cast lead, lead wool (hand caulking) and lead (pneumatic caulking), these facts, after 10 years or so, would be very valuable to all companies laying large pipe. In the meantime, Mr. Simpson is deserving of our thanks for having blazed a new trail and brought it to our notice. I have already stated that Philadelphia has done little with lead wool. It has, however, had a larger experience with cement joints than any other city, and what follows is given as being of value to Institute members. The practice of using cement instead of lead for small pipe was begun in 1900, and, in 1902, extended to all sizes. From the beginning, a careful record was kept of all leaks found in cement joints, because it was thought important to know *exactly* what success, or failure, was met with. The results to the end of 1909 are as follows:

Size of Pipe, Inches.	Feet Laid.	Leaky Joints.
4	105,124	7
6	1,333,953	25
8	49,891	3
12	59,967	19
16	33,687	54
20	51,833	99
30	20,521	332

The record is entirely satisfactory, except for the 30-inch. Half of this pipe was laid by "A" district organization and half by "B." On the "A" half, 310 leaks have been found; on the "B" half only 22. This being the case, it seems as if the "A" caulkers did not possess the knack of those employed in "B" district. At any rate, as long as 10,000 feet have only shown 22 leaks in 4 to 8 years, we do not believe it is impsssible to make a 30-inch cement joint that will stay tight. We have not been able to arrive at any definite opinion why there have been so many failures in "A" district. Ground vibration, due to railroad trains, and settlement due to shifting gravel, are two causes that may have had some effect; but personally I believe that the fault lay in the "man behind the hammer," and that "B" district obtained a stronger adhesion between cement and iron than did "A" district. In almost every case the crack was a very fine one. It showed no partiality for any particular portion of the circumference, and the cement separated from the spigot as often as from the bell. In order to eliminate settling from the causes of joint leaks, two years ago it was decided to use concrete piers, two under each length, when laying 1,200 feet of 36-inch pipes. So satisfactory was the experiment that this spring the same support was given to 3,000 feet of 30-inch. Data from these lines will be interesting after some years have gone by. Of course, the most satisfactory feature of cement joints lies in their cheapness. In round figures, Philadelphia must have saved $100,000 by the substitution of cement for cast lead.

The President—Are there to be any other remarks on this lead wool caulking? If not we will call upon Mr. Simpson to close the paper.

Mr. Simpson—There is nothing further I care to say in this connection except with reference to the shape of the caulking tools, Fig. 1. We tried all sizes and shapes of every size and finally adopted this style. This tool is about a square inch of metal. We found it made a good sized test. We get plenty of pressure from the hammer and just do the caulking so much quicker. If we had a little tool like a hand tool we just punch a hole in the lead. This table of the different sizes of tools is what we are using at present, but you practically have to evolve your own tools for the different sizes of pipes, depending on the pipe you use and the amount of lead space you have. In regard to the tests on this line, question of leakage, I would say that the line is not yet completed, so we have not made any tests of any kind. It is not our practice to make pressure tests. But I would say in that territory a 30-inch line was laid about 2 or 3 miles long. It has been in service 3 years. The lead wool is hand caulked and there has not been a single leak on it. Now, if we get a better joint with air than we do by hand, we ought to have better than no leaks in the 48-inch line.

Mr. Earnshaw—Mr. Simpson did not answer the question which was of interest to me, as to the operating pressure of this main and the pressure under which it would be tested. If he would give us definite information on that point I think we should be glad to hear it.

Mr. Simpson, Jr.—I think I stated that it has not been our practice to make pressure tests on mains, if that answers the question, and the operating pressure would not be more than ½ a pound. It is a low pressure line.

Mr. Earnshaw—What is the operating pressure on this 30-inch main?

Mr. Simpson, Jr.—About 2½ inches. They are all low pressure lines.

The President—If there is no objection we will pass a vote of thanks to Mr. Simpson for his paper. [Adopted.]

Mr. Simpson, Sr.—I have proved conclusively a great many years ago that I can take a cast iron main of any size, whether 4, 6, 30, 36 or 48 inches in diameter, have a caulker pass his chisel around that joint, and I could test it up to 5 pounds and show tight, but it would only show tight about a week. That to my mind shows the fallacy of any test of a large main being any good when it is made immediately after the main is laid. The trouble comes, not from the caulking of the joint (the joint is nearly always tight at starting), but with a large size pipe the least settling upsets the caulk and the joint commences to leak.

(To be Continued.)

[Abstract Report.—Continued from Page 317.]

SIXTH ANNUAL MEETING, NATIONAL COMMERCIAL GAS ASSOCIATION.

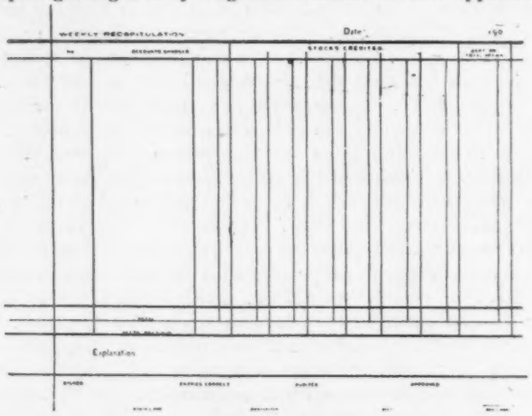
Held at Mechanics' Hall, Boston, Mass., Dec. 6th to 9th, 1910.

Second Day—Afternoon Session.

OFFICE AND ACCOUNTING METHODS—*Continued.*

The plan of having all accounts on one bill works out first rate and gives less trouble in collecting. We will now go back to the order for connecting appliance. This order when completed by the fitter is turned in to the shop foreman, who checks over the time and material and approves it. The stock clerk takes off the material used for his weekly stock voucher. But we will go a little farther back and show how the fitters are checked up. A weekly stock sheet is made and shows each day the number of each kind of stock drawn and the number of each kind of stock used, and the weekly inventory of each wagon should equal the difference between the stock drawn and used. At the end of each week these sheets are sent to the office, together with a stock transfer voucher, showing the total charges to the expense or construction accounts and the total credits to the stock accounts. These wagon sheets are checked at the office for price, extensions and totals.

From these stock transfer vouchers we get the "Cost of Appliances" and the materials for "Connecting Appliances." Labor used in connecting appliances is charged through the pay rolls, the fitters and helpers getting a daily wage and a bonus on each appliance connected. I believe that the unit method of charging will produce the best results when the system is once installed. In several places, where the change from the regular salary was made, the volume of work accomplished by the same force of men has been more than doubled, while only 10 per cent. of the saved salaries was necessarily



Form 14.

expended in inspection to make sure that the work was properly and permanently done.

By accumulating these orders, each man's work can be totaled first, in order to give such information as cost of connecting per foot of pipe used, average cost per appliance, labor per foot and per appliance, etc. This will give a good comparison between the different men of the department and gives the superintendent a check on their work. All this detail work, in keeping such close record of all appliances and materials used in connecting appliances, is of great importance to the new business department; for every dollar saved along these lines enables the new business manager to make a better showing at the end of the year.

Appliance or New Business Expense.—This account covers the salaries of the clerks in the new business department who are kept busy with the details, such as listing the solicitor's calls on the house cards, figuring points on revenue that the representatives bring in, and numerous other things that are necessary in a well-conducted new business department. In this account also we charge the proportion of office expense, rent and sundry items that are charged to promoting new business. This account should be closely watched by the new business manager, and all miscellaneous charges should have his O.K. on them.

The new business manager's report, both daily and monthly, should show the amount of gas sent out each day compared with the same day last year, with increase or decrease per cent., as shown in Form 15, and it should also have a summation of some such record as Form 7, previously shown in this paper. This would show the amount of busines signed up by each man under the different headings and rates, the amount of yearly revenue it would bring in and at what expense to the company.

191

Gas Sent Out
Same Day of Week Last Year
Increase per cent. Decrease.
Sent Out this Month to Date
Sent Out Same as Last Year
Increase per cent. Decrease.
Load Factor on Basis To-day's Maximum Demand
" " " " Greatest " "
Weather this Year Last Year

Form 15 (Front).

	Candle Power	C. G.	W. G.	M. G.
	Calorific Value	C. G.	W. G.	M. G.
	Number of Complaints			
	Condition of Service			

Form 15 (Back).

	Month.		Year.		Year.	
	Ranges.		Water-Heaters.		Heaters.	
Day of Mo.	1910.	1909.	1910.	1909.	1910.	1909.
1						
2						
3						
4						
5						
6						
7						

Form 16.

Another report he should receive is an accumulative report of the number of appliances connected each day compared with the same day last year.

It would also be of great interest to him and to the general manager of the company to get out the following report (shown in Form 17):

MONTHLY REPORT.

Date. ..... Name of Representative.	Calls Made.	Salary Paid.	Avg. Cost per Call.	Orders Taken.	Calls on Orders.	Avg. Calls pr. Order.	Avg. Cost per Order.	Revenue a "Signed Up."	Avg. Cost per $1 Rev. Signed Up.
Totals									
Avg. per Rep.									

Form 17.

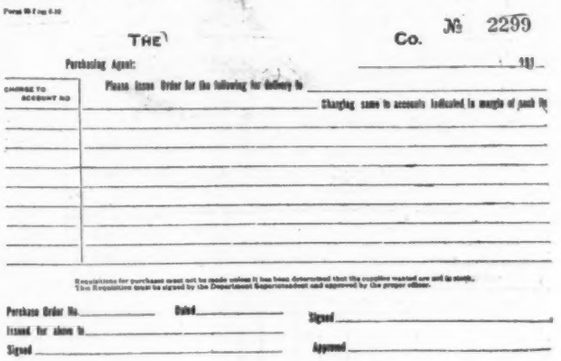
He should also get a report from the accounting department each month, showing the cost of promoting new business under the subdivisions as shown in Form 1.

These figures will give the actual cost of running his department, and, if he finds by comparison any part which he thinks is too high, he can have the account itemized.

The new business manager should, at the first of the year, with the aid of his assistants, get out an estimate of what his department is going to cost for the year and the estimated gross revenue to be turned in by the representatives. These estimates can be made to come quite close by checking the monthly estimates with the consumers' ledgers for the past 12 months. At any rate they can come within 20 per cent.

Purchasing of Supplies.—The system for the purchase of supplies for a large company, and one that seems to be generally used, is that a requisition is made for the materials to be purchased, showing what account is to be charged and what the materials are to be used for.

The purchasing agent then issues the order in triplicate, the original going to the firm from whom the material is to be purchased, the


THE Co. № 2299

Purchasing Agent: 191

CHARGE TO ACCOUNT NO

Please Issue Order for the following for delivery to

Charging same to accounts indicated in margin of page

Requisitions for purchases must not be made unless it has been determined that the supplies wanted are not in stock. The Requisition must be signed by the Department Superintendent and approved by the proper officer.

Purchase Order No. Dated Signed

Issued for above to Approved

Signed

Form 18.

Form 10-2. Orig. 4.

Office

The Co.

Dated,

Put this No. 63499 on your Invoice

M

Please deliver to

mailing invoice with number of this order immediately after delivery:

Render separate bill for each order. City accounts paid on the —— of each month

We will not in any manner be responsible for goods delivered or work done for our account without a written order.

Yours truly,
The Co.
Purchasing Agent.

Form 19 (Original).

Form 10-2. Dup. 4.

Requisition No.	Duplicate of Order The.....Co. Dated,	No. 63499
Charge to Account	Issued to For delivery at On requisition and account as indicated on margin for the following:	
	Invoice for above dated Amounting to Checked by	Signed by

Form 19 (Duplicate).

Form 10-2. Trip. 4.

Requisition No.	Copy of Order. The.....Co. Dated.....	No. 63499.
Charge to Account.	To..... For delivery at..... On requisition and account as indicated on margin for the following:	
	See instruction on back hereof.	Signed by

Form 19. (Triplicate.)

Notice.—The person receiving the goods mentioned on the opposite side of this sheet will make a detailed report in the space provided below, stating there the date, quantity, weight and condition of the same, and whether delivered by railroad, express, team or otherwise. Where material has been purchased for stock to be held in charge of the storekeeper, the fact will be indicated by making a check under the heading of "Stock."

Date.	By Whom Delivered.	No. of Pieces.	Weight	Article.	Stocks.	Remarks.

Freight Charges $ ... Express Charges $ ... Signed .....

Form 19. (Back of Triplicate)

duplicate going to the foreman or storekeeper who issues the requisition and the triplicate remains in the office. As soon as the storekeeper receives the material he writes down the articles received on his copy, which is the duplicate, and signs his name to it, with the date the articles were received, and returns it to the office of the purchasing agent.

When the purchasing agent receives the bill for the goods he compares it with the duplicate of the order, to see if the articles are billed correctly, checks it as to price from quotations noted on the requisition, and then for extension and addition. If the invoice is O.K. he attaches the requisition and the duplicate of the order to it with a clip, marks the account it is to be charged to and sends it to the voucher department to be paid.

Stock Records.—There are a number of forms for the keeping of stock records, but the most practical and most generally used is the loose-leaf system, with sheet for each article. In the first column, under the heading of "received," we have the date, purchase order number, number of articles and price per article; under the heading "disbursed," in the second column, date, order number, requisition number and number of articles, then balance on hand, price per article and total value. In the "received" column the price per article seems useless, but, as the prices are continually changing, unless the stock clerk puts in his price with every new shipment, he is liable to forget and not change his price until his attention is called to it by the purchasing agent. The balance column is only extended at inventory time in order to check up with the general books.

The most convenient way to take inventories for the storekeeper is to take one stock each month and to have the classes of stock so divided that each one will have at least two inventories a year. By doing this way, the storekeeper can give more care to it than in the old way of taking all the stock at one time. The wagon sheets and stock transfer vouchers, which I spoke of in handling appliances, are used in all departments, a separate one being made for the electric.

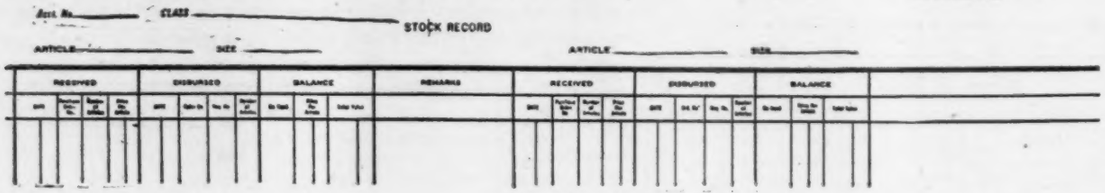
Consumers' Ledgers.—The question pro and con has been discussed in regard to loose-leaf ledgers, but it is generally conceded that for combination companies, gas and electric, the loose-leaf is the best. For small companies that have just the gas, the bound form is the best, more especially if the company is not growing very fast. Form 21 is the form in use by some of the companies.

Consumers' Deposits.—The card system for the keeping of deposit records with the lock-drawer cabinet is the best and newest way. The following is the form used:

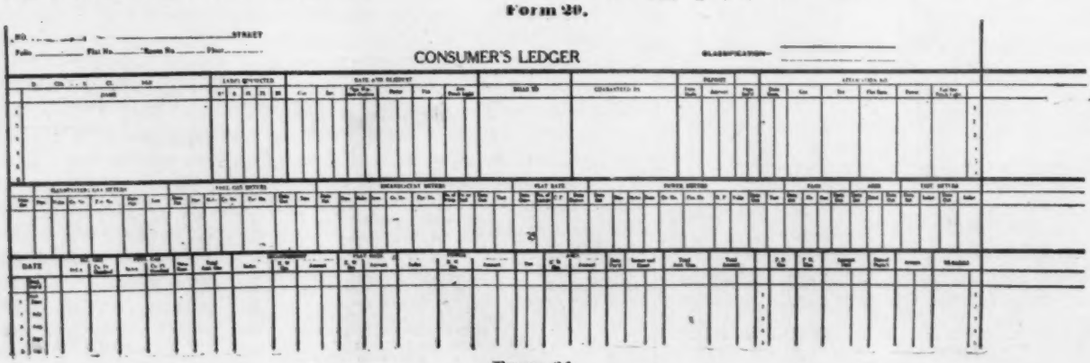
Form 2-2a—2m—'-10.	Date issued.	Date ref'd.	By whom.
			Deposit No.
Name			
Address			Amt.
Address			Amt.
Address			
Address			

Refund.		Applied.
Date		Date
Amount		Amount
Interest		Amount

Form 22.



Form 20.



Form 21.

Application.—The card form of applications is now, I believe, in general use. The wording is stated as briefly as possible and still is a binding contract.

Office Detail.—When a prospective consumer steps up to the application window and states that he wants gas at his residence, the clerk should be most courteous and endeavor to make a good impression. He

Form 1-1.

Issue....Order. Execute....Monthly Billing Period ...Disc. by....

CONTRACT FOR GAS No .....

.....

The , is hereby requested to supply gas to the undersigned to be used for illuminating or fuel purposes, or both, and to furnish the meters that are now or may hereafter be required, in the premises known as

No..... .....St. Ave.

Floor.....Room.....Flat No.....

and the undersigned agrees to pay for rental of meters and for all gas used from the date hereof and until such time as the supply shall be discontinued, at the rate of $ .. per thousand cubic feet with a discount of 10 cents per thousand if paid within ten days from date of bill, under the terms of the rules and regulations of the

receipt of a copy of which is hereby acknowledged.

The above in accordance with provisions of franchise adopted May 15, 1906.

For value received, I hereby guarantee payment of all bills to become due under above contract.

.....

Address Property Owner.

.....

Sign with Ink—First Name in Full. Consumer.

Form 23 (Front—Contract).

should ask the necessary questions in such a manner that it would be impossible for the applicant to take offense, especially if a deposit is asked, as this is rather a delicate point with most people. The form of the application to be signed by the consumer is shown on Form 23.

Name..... .....St..... .. ..

Previously supplied at

No.	Street.	Remarks.
.....	.....	.....
.....	.....	.....

Nature of business.. .....

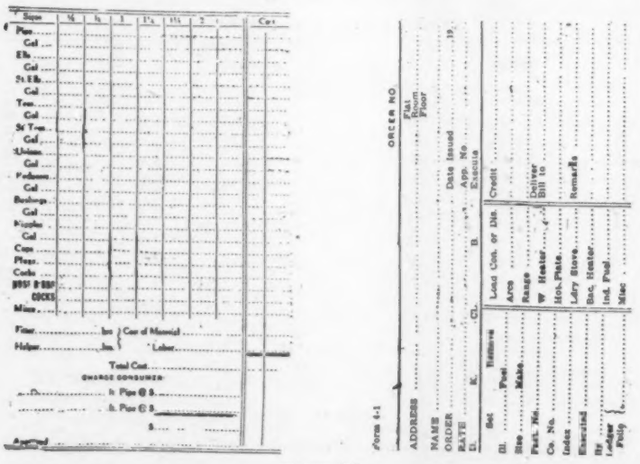
D .. Cir ...K .. Cl ...B....How carried .....Taken by .....

Deposit.			Unpaid Bills.			Consumer Old New	
Date.	Amt.	No.	For	Amt.	Paid	Guarantor For	O. K.
.....	.....	.....	.....	...	....	.. ..	App. o.k....
.....	.....	...	.....	...	....	.....	Guar. o.k. .
.....	.....	.....	.....	...	....	.....	Held... ....

In .....Mos. From State of..... ... .

Form 23 (Back—Application).

After this card is signed, it goes to the credit department, where it is passed upon. If there are any outstanding bills against the signer, he is notified, and, if the account is long standing, the application is held until the account is paid; but, if it is a small amount, it is put on his first bill and the application passed through. The order is then issued to set the meter (see Form 24).



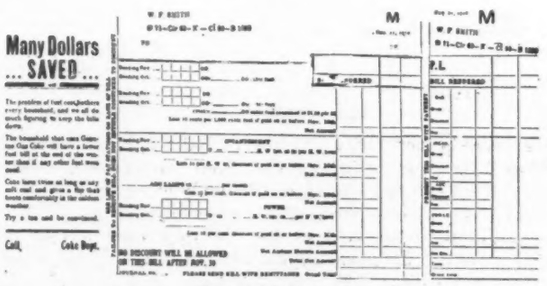
Form 24.

This form is very similar to Form 10, and is issued in triplicate and handled the same. When the original of the order is returned from the fitting shop, it is sent to the consumers' ledger bookkeeper and is written up on Form 21, and the bookkeeper marks the ledger folio on the order, showing the order is written up. At the same time, he makes out the meter slip for the meter reader. These slips have coupons for each month (each slip being numbered the same as the account), and are taken off after the meter is read, so that the meter

Form 25.—Meter S ip.

reader has nothing to go by. Therefore, he must be very careful to read the meter correctly. In this way, the temptation to guess at the reading, if the consumer is not at home, is avoided.

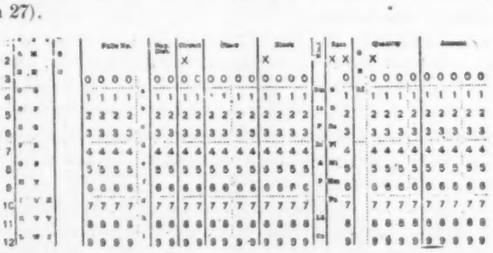
It is a good plan for any company that uses this coupon meter slip to have special cabinets made, with shallow drawers, divided into spaces just large enough to hold the coupons, so they can be kept in numerical order. In billing out the consumers' accounts, use two men, the bookkeeper and a helper. The bookkeeper makes the entries as to the reading of the meter and the amount and the helper calls off the reading as shown by the meter slip, enters it on the bill, and checks with the bookkeeper on the amount of cubic feet used. By using two men this way, the work is turned out faster, and it does away with a bill clerk and it is especially advantageous with combination companies, as there are usually more different rates on the electric.



Form 26 (Front).

Form 26 (Back).

In the Denver company we use the Hollerith Tabulating System, of which I will give a short description. As soon as the consumers' bills are completed by the bookkeeper and helper, they are sent to the tabulating department and a card is punched for gas or electricity (see Form 27).



Form 27.

You will note the card is divided into columns or fields: First, the month; second, division letter; third, R (regular bills), S (skips), and C (corrections). These 3 columns are punched on a gang punch, about 12 cards at a time. The other 11 columns are marked to tell what each is for and numbered in vertical columns from 0 to 9. All information, as shown on the bills, is punched on the cards, together with the cubic feet and the amount. The bills are divided into 100 folios and listed on an adding machine, and the total should

equal the amount of the tabulation. An experienced clerk can punch about 1,500 cards a day. The tabulating machine will tabulate about 150 cards per minute and the sorting machine will sort cards at the rate of 270 per minute. This system would only do in large companies, where comparisons as to the amount of business under the different headings would be necessary, and, when once punched on the cards, can be taken off at any time. The amounts by hundreds are given to the bookkeeper, and he checks with his revenue sheets, and, when proved, makes out the Form 28 report for the general bookkeeper.

Statement		Ledger		
Forfeited Discount Gas Bills				
Meter Rents				
Illuminating Gas	cu. ft. at			
" " Doherty Rates	cu. ft. at			
Fuel Dm. " "	cu. ft. at			
" Ind. " "	cu. ft. at			
Special Rate	cu. ft. at			
Fuel Gas, Domestic	cu. ft. at			
" Industrial	cu. ft. at			
" Power	cu. ft. at			
Folio	Total,			
Arrear				
Advance Payments,				

Ent. Journal Folio.....

.....

Bookkeeper.

.....Revenue. .....

Form 28.

The general bookkeeper makes his entries through a journal, charging "Gas Bills" and crediting "Gas Sales" and closing "Gas Sales" into a "Net Earnings" in regular double entry books.

Probably, the next time this consumer comes to the office, it is to pay his bill, and on arriving at the office, he finds that he has forgotten to bring it. He goes to the duplicate bill window to ask for a duplicate. A pleasant clerk asks his name and address, which he notes on a blank form (Form 29), stamps the time on it, and sends it

DUPLICATE BILL

FOR

Name .....
Address .....
Apt. No.....
Remarks.....
.....
.....

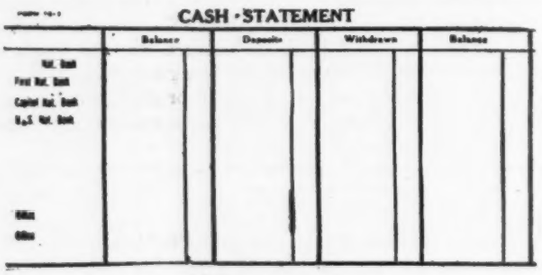
Form 10-3-8-10-5M. **Form 29.**

through the compressed air tube into the bookkeeping room. A boy takes it to the right bookkeeper who immediately makes out the bill and sends it back to the consumer, who, in all probability, has not had to wait more than 3 to 4 minutes. He then takes the bill to the cashier, who receipts it and hands back, thanking him. The consumer goes out with a pleasant feeling that he has been promptly and courteously treated. Nothing is more disagreeable to a business man than to have to wait. There are a lot of people who come into the gas office who only go to the cashier, and it is up to him to give them a pleasant word, and, if they kick about the bill, refer them to the complaint department.

In the cashier's cage should be an electric receipting machine that cuts the coupon off at the same time it receipts the bill, an automatic change machine, in order to save both the cashier's and consumer's time; he should have an electric adding machine for footing up the coupons and listing checks and the main cashier should have an assistant for sorting the coupons according to the divisions and to do the listing and to go to the bank.

The only books the cashier should be required to keep are the daily cash record and a general cash book, showing the different receipts by days for the month. This book is sent to the general bookkeeper and posted once a month. The cashier should also make out in duplicate a daily cash statement card (Form 30) on which he shows his receipts, amount deposited and the cash on hand.

This card is then sent up to the general bookkeeper, who fills it out by inserting the amounts disbursed and the balance in the banks. One of these cards is for the treasurer and the other for the auditor, so that they may be posted each day. The cashier sends the coupons each day to the different bookkeepers, with a machine listing attached and a teller slip with the total of the coupons.



Form 30 (Front).

DAILY CASH STATEMENT.

.....191....

Balance brought forward			
Gas collections			
Electric collections			
Stove accounts			
Miss. accounts			
P. & F. accounts			
Pintsch accounts			
Coke accounts			
Lamp accounts			
Tar accounts			
Backus accounts			
Meter deposits			
Total receipts			
Total to account for			
Accounts payable			
Pay roll			
Meter deposits			
Interest on deposits			
Cash on hand in bank			
Total to account for			

Form 30. (Back).

DAILY REPORT OF CONSUMER'S PAYMENTS.

Division.....

.....191....

Gas and electric bills			
Forfeited discounts			
Arrears			
Meter rents			
Bookkeeper's total			
Teller's total			

Return to teller promptly each day.

No. gas collections .....
No. electric collections .....

Form 31. (Front).

ARREARS—GAS AND ELECTRIC.

Month.	Amount.			
				From .....
				" .....
				" .....
				" .....
				" .....
				" .....
				" .....
				To.....
				" .....
				" .....
				" .....
Total.....				

Form 31. (Back).

The bookkeeper fills in the subdivisions and returns the slip to the cashier, and from this slip the cashier gets his divisions for the general cash book.

Complaints.—The position that needs the most patience and self-possession is that of the complaint clerk, who must smile while being blackguarded and explain over and over again to the consumer why it is possible the bill for this month is a few cents higher, when the gas had not been used as much. He must spend just as much time with this small consumer as with the large consumer, whose bill is several dollars higher, and must treat each one as if it would be a

personal pleasure to investigate and have the meter reread or changed, if the consumer wishes it.

The complaint orders are issued in triplicate the same as the other orders, and should be so filed on their return that the clerk can get at them at a moment's notice. It is also a good plan to send out return postals on complaints, such as leaks or poor pressure, asking if the complaint has been properly attended to and the consumer satisfied.

The complaint clerk should make out a daily report of the number of complaints, as shown on Form 32.

Form 33-2—1m—9 08.

SUMMARY OF COMPLAINTS.

GAS DEPARTMENT.

For Day Ending 12 p. m.....

	To-day.	Previous Days This Month.	This Month to Date.	Last Year.
Leak				
Poor pressure				
No light				
Adjust stove				
Adjust water heater				
Water leak in water heater				
Put up pipe				
Adjust Backus				
Put up pillars and tips				
Gas high bills				
Install clock meter				
Complaint Regarding Employees				
Gas miscellaneous				
Total				

Form 32.

One of these should go to the general manager and one to the new business manager.

General Books and Accounting.—In this department, the total of the month's business and the reports from the works and stations are compiled for the monthly statements and is, to my mind, the most interesting of any. All corporations use the voucher system and some the voucher check system. The voucher system with a loose-leaf voucher, distribution journal, wtih different columns for purchases, stock, pay-rolls, miscellaneous charges, total and credits (Form 33), is the best; for this way you can combine all the charges to the different expense accounts, and make one posting monthly. In this book the leaves can be of different colors and can be numbered the same as the lines on the monthly reports. By doing this, it greatly facilitates the getting out of the earning statement at the close of the month.

Form 20-3-19. No.....

TRANSFER VOUCHER.

Date.....190

		Accounts Charged.	Accounts Credited.

Explanation.....

Entries Correct.....Bookkeeper.

Audited.....Secretary.

Approved.....Gen. Man.

Form 34.

Discussion.

The President invited discussion on the Hughes paper.

Mr. Clabaugh said he understood the Denver Company had built one of the largest office buildings in the United States occupied by a gas company. He could not understand why it should be so great, but he could readily understand now, since it required a large building in which to file all of these cards they require. Simplicity with accuracy should be the first requisite of business. Possibly all that data could be gone over by anybody without very great expense, but in the end they got no return. All of the data largely emanated from the technical departments, and in the manufacturing department of a gas company it was absolutely necessary to know every detail of the business; but would someone tell him of a department store in this or any other country that could possibly do business with all of this card system, even if it did reveal how much it cost to sell and deliver a spool of cotton or a paper of pins. The gas business differed from no other, in that it was a mercantile business; and what he hoped to see some day was the requiring of fewer clerks to keep up the strictly mercantile end. He would like to see everything they got charged into store room and charged then out to merchand se, crediting to the latter the sale value. The annual inventory would show the profit and loss. He was sure they were getting to rely too much on this card system. To think of what following up all of these forms meant it would require two or three men every work day.

Description

Operating Acct. No.....

To be closed into acct. No.....

Form 54 1.

	Date.	From.	Items	Reg. or Voucher No.	Charges.					Credits.	Genl. Ledger Folio.
					Purchase.	Stock.	Wages.	Misc.	Total.		

Form 33.

On the credit sheets of this journal are posted the credits to the stock accounts from stock vouchers (Form 14), also any other credits from transfer vouchers (Form 34).

This book, the voucher register, check register, general journal, general ledger and balance book, are all that are needed in the accounting department.

Each year we find that we can make some improvements along the different lines of bookkeeping and accounting, and it will probably always be so in a progressive company. A public utility corporation must give the people as good service in the office as in the distribution of gas from the consumer's standpoint, and the officers and heads of the departments should be so efficient that every dollar of revenue that should be coming to the company is received; all meters should be carefully watched, both for and over and under readings; all expenses kept down to the minimum; all new methods, where there is a chance to save time, tried out; and, above all, there should be a loyal, enterprising corps of men who will give their best to the interests of the company.

The salesman who had to do all of this could put down the data. It was absolutely necessary that a salesman going out on a route should make notes of prospective consumers, but why should he write down whether the prospective consumer was married and had 1 child or 14? That made no difference and it took up too much time. They were selling gas, not running a census bureau, and they should be selling gas as many hours as they could. He did not mean to say they should not keep any cards. He really thought they should; but he did think if they kept about one-tenth the number, following up the data that was on them, it would be very much better for them and they would get what they actually needed, not something they might want 10 years hence to make a needless comparison. He might be very radical on the point, but he thought they were going too far absolutely.

Mr. McPherson said they had a 10-story building in Denver, and were using at present 3 of its floors. All the space needed for the millions of cards they might be supposed to need was about as large as might be required in 3 or 4 ordinary sized offices. There was hardly an item there stated but was used every week or month, to make an

important saving in the business or to determine some cost it was important to know.

The President said a point that suggested itself to him when he read the paper was in connection with application cards and their signing. He thought they were altogether too particular about the signature thereon, and it seemed an inheritance from the time where they obliged customers to sign in a big book. As a matter of fact, they all knew the signature on an application card was valueless. If the customer did not intend to pay his gas bill it was unprofitable to bring action against him for a few dollars. It seemed to him some of the forms mentioned might suggest something to other members.

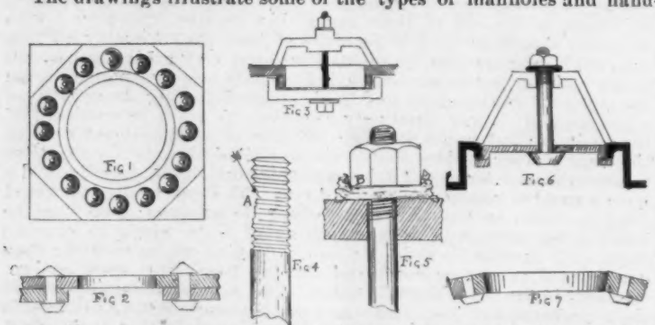
(To be Continued.)

Manholes and Traps of Gas Tanks.

[Communicated by "R."]

The elliptical shaped openings in the various forms of tanks employed about a gas works exist in various design and condition, some of the openings being mere gaps with covers, while others are well shaped and carefully protected, as anyone may without fatiguing search discover numerous types of the leaky description. Sometimes the manhole or handhole is not correctly planned, or cannot be gotten at readily, due to the surrounding conditions. Again, the recesses are so poorly arranged that trouble is experienced in managing the lid. The caulking down of the cover is often carried to such an excess that something has to be chipped, filed or broken before the hole can be opened so that a workman can either insert his arm or enter bodily. The elliptical manholes in tanks and boilers about a gas works are found averaging from 10 inches to 14 inches in their minor axes and about 8 inches larger in their major ones. Many of the holes were originally cut too small for the man of average proportions. In fact, it is not unusual to get stuck in the holes, and trouble is experienced in getting them free. Sometimes the reinforcing of the manhole is of such order that it acts as a hindrance to the passage of the hole and cutting and chipping are resorted to. The use of extra rings frequently results in one or more of the rings slipping out of place and making trouble. Manholes with flanged steel frames or saddles are useful and may sometimes be seen in service.

The drawings illustrate some of the types of manholes and hand-



holes found in the tankage and boilers of gas works. Fig. 1 explains the practice of reinforcing openings in the head or shell of a tank or boiler, with compensate rings riveted to the plate direct, and Fig. 2 is a sectional drawing of this combination. Instead of using this form, many of the boiler and tank builders make flanges in the heads, thereby doing away with the extra ring for strengthening purposes. In Fig. 3 may be seen a form of man or handhole often encountered nowadays. The edges of the plate are bent inward to form the flange for the shoulder of the cover, and the latter is securely supported in place by drawing up with the butt and threads on the middle bolt and saddle. Of course, one will find weak and defective saddles, and I observed examples of these which were bent enough to release the bolt and cover to the extent of permitting leakage. This is not necessary in a works in which the mechanical end is kept up. The saddles should be strong enough to make certain that the metal will not spring under considerable pull by the bolt. A workman often tries to squeeze up the lid hard enough to overcome some defect in the packing, and rather than overhaul the gasket he will tighten up on the nut. Again, cases are seen in which the threads are worn from the bolt, as at *A*, Fig. 4, in which case you are going to have trouble with the cover, unless the nut happens to come where the threads still remain. I have seen covers drop directly into the interior of a tank because of the loss of threads on the bolt.

Corrosive matter will in time destroy the threads and so weaken the connection with the threads of the nut that the latter may slip off. Or perhaps the packing about the nut is poor, as at *B*, Fig. 5. Instead of using metal washers, workmen will at times employ leather or rubber washers. These washers will get cut and ground by the action of the edges of the nut, destroying the same in time.

Fig. 6 shows a type of saddle sometimes in evidence. The arrangement of the combination is such that the fitting of the flanges can be made securely with an average pressure, and if the proper packing is installed, average pressure being applied by the nut and bolt, a good union results. Some of the openings for the hand holes are now shaped with beveled edges, as in Fig. 7.

Steel flanges are used more freely than formerly, and while many cast iron covers are still in use, it may also be noted that wrought iron covers are becoming popular. Steel covers are required by some gas works' engineers, while various patented combinations may be seen in service the world over.

Items of Interest
FROM VARIOUS LOCALITIES.

MR. JUDAH P. GRAY has resigned the Superintendency of the Homer and Cortland (N. Y.) Gas Company. His successor is Mr. W. J. Murdock, of Bethlehem, Pa. Mr. Gray proposes to engage in the real estate business at some point in Idaho.

MR. THOMAS D. PETCH has resigned the position of Manager of the Santa Rosa (Cal.) branch of the Pacific Gas and Electric Company in order to take up the duties of Manager of the Medford (Ore.) Company.

MR. JOHN H. KLINGE has resigned the Secretaryship of the Spokane Falls (Wash.) Gas and Electric Company. His successor is Mr. Henry Warner, formerly Secretary of the Lincoln (Neb.) Gas and Electric Company.

MR. FOSTER L. KINGSBURY, who is a graduate of Colgate, Hamilton (N. Y.) College (Class of 1910), has been appointed to a position in the Research Laboratory, U. G. I. Company's Philadelphia headquarters. If we mistake not, the appointee is a son of Mr. E. L. Kingsbury, who is well known to the gas fraternity of New York.

THE Gas Machinery Company, of Cleveland, O., is under contract to construct for the Waco (Tex.) Gas Company, an additional water gas set. The agreement also calls for quite a consignment of miscellaneous apparatus. The Waco Company has also arranged for a lengthy addition to its distributing system.

AT the annual meeting of the Annville and Palmyra (Pa) Gas and Fuel Company, which was held in Lebanon, Pa., some days ago, the officers chosen were: Directors, E. U. Bowers, H. T. Atkins, J. A. Rittle, J. L. Beckley, Albert Kerr, U. S. Poorman and W. A. Phraener; President, A. U. Bowers; Secretary and Treasurer, J. A. Beckley. Under Mr. Miller's Superintendency the Company seems to be progressing finely, in that the annual reports (he has been in charge since Sept. 19th) showed that 373 services have been connected up. We believe it has been determined to extend the main system to the adjoining districts of Hershey, Derry, Swatara, Bowerstown and Hummelstown, as soon as the frost is out of the ground. A high pressure system will be installed.

MR. LOUIS N. RANCKE, whose excellent work in connection with the business of the Baltimore (Md.) Retort and Firebrick Company for a number of years has made him well known to the fraternity, has been appointed to a responsible position on the engineering staff of the Laclede-Christy Clay Products Company. We congratulate the Laclede-Christy Company on securing services of such an excellent man, and congratulate Mr. Rancke on his affiliation with such an excellent corporation.

AT the annual meeting of the New Britain (Conn.) Gas Light Company the Directors chosen were: A. J. Sloper, Robert S. Brown, Harold T. Sloper, E. N. Stanley, Jno. Walsh and F. M. Travis. The new member of the Board is Mr. R. S. Brown, whose cleverness as a business man is well attested by his grasp of the affairs of the New Britain Machine Company, of which corporation he is Secretary.

THAT "truly Great" Mayor of Des Moines (Mr. Hanna), has decided to accept the Company's offer to supply gas at 92 cents per 1,000 net, instead of the 90-cent rate, that the Mayor would contend for, even in the United States Court. Selah!

MR. W. C. MORRIS has retired from the Presidency of the Laclede-Christy Clay Products Company, but has consented to remain with the corporation in the capacity of Chairman of the Executive Committee. He will spend some time in Southern California, preparatory to resuming active business. Mr. James Green succeeds Mr. Morris in the Presidency, and he also will serve as Chairman of the Board of Directors. Mr. Richard D. Halton has been elected Vice-President and Treasurer, and Mr. Montague Lyon will act as Secretary and Counsel. The Directors are: Messrs. James Green, W. C. Morris, Robt. H. Miller, Montague Lyon, R. D. Halton and Jno. L. Green.

MR. ROBERT M. HESS has been succeeded as Manager of the Nebraska City (Neb.) Gas Company by Mr. H. A. Daum. Mr. Hess, we understand, has been appointed Superintendent of a plant in Wisconsin, but we are not informed of the exact location thereof.

At the annual meeting of the Peoples Gas Light and Coke Company no change was made in its executive management. In reporting on the Company's condition, President Knapp noted: "During the year, 84 miles of mains in extension of the Company's system were laid. The increase in the number of gas meters set was 25,921, and in the number of gas stoves installed, 26,199, and in the number of arc lamps, 2,926. A committee of the City Council, through its experts and accountants, has been engaged for a considerable period of time in the work of investigating the cost to this Company to manufacture and distribute gas, the value of the Company's property, etc., as preliminary to fixing the rates to be charged for the ensuing 5 years. The present net rate of 85 cents per 1,000 cubic feet has been in force since February 1, 1906. "During the year $3,000,000 of the refunding 5 per cent. gold bonds of the Company were sold in order to place the Company in funds for necessary expenditures made and to be made during the years 1910 and 1911." The condensed trial balance, December, 1910, certified to by the Auditor, showed the result of the operations of the Company for the year 1910. There was also shown the gross and net receipts for the 12 months, together with the total mileage of mains now owned and operated by the Company, the number of meters, gas stoves, arc lamps and public lamps. The affairs of the shareholder's meeting were directed by Vice-President Meagher, and in his address to those present he remarked, respecting the political hue and cry that the politicians are making, as a part of their contesting the election for Mayor for the ensuing term, as follows: "It is unfortunate that our affairs have been made a political issue in the Mayoralty campaign. The city has the right to examine our books and everything we have, which privilege has been extended. The Company will accept any reasonable proposition in point of prices for gas, but will not permit an unreasonable one to be forced upon it. The courts are always open to these affairs."

Those now in command of the gas supply of Stoneham, Mass., have instituted a net rate for gas of $1.50 per 1,000 cubic feet. A minimum or service charge of 50 cents per month has been established, and the Company has agreed, in the case of new business, to lay services up to 50 feet in length without charge, all excess over the prescribed length to be charged for at the rate of 30 cents per running foot.

The New Hampshire Legislature has been petitioned to authorize a union of the Rochester and Somersworth Gas Companies.

Messrs. B. C. Atwood, H. H. Heminway, Jno. L. Scott and R. V. Magee, have incorporated the Watertown Gas Company, from which it is proposed to supply gas to the adjoining districts of Watertown and Oakville, Conn. The people in interest are responsible residents, and it is quite certain the plant will be put in this spring.

The annual meeting of the Washington (D.C.) Gas Light Company was held early this month, and perhaps ⅞ of the stocks outstanding were represented either in person or by proxy. The Directors elected were Messrs. John R. McLean, John McIlhenny, Joseph Leiter, James M. Green, R. H. Gouldsborough and Ord Preston. The result of the election having been announced, Mr. Gouldsborough made the following address: "We have been making history during the present year, and I have been requested to outline to you briefly the future policy of the Company. It is our purpose to utilize the peace pact that had practically been established with the District Government by devoting our individual energies to the promotion of our business for the use and benefit of all whom it may concern, including our 50 odd thousand consumers. In order to do this more effectively it is proposed, in the first place, to establish a commercial department, to be conducted under executive committee management. Among other things the committee will endeavor, by judicious advertising and active solicitation, aided by substantial reductions in the prices of gas appliances—heating, cooking and illuminating devices—to promote the sale of the Company's products, to the end that we may be able in the near future to furnish our consumers the best gas, and the cheapest gas, all things fairly considered, on the Atlantic seaboard. Having twice voluntarily reduced the price of gas within 2 years, we will break the record, if we can, by yet announcing another reduction within the third year. Among other things to which we look for increased revenue from now on is a substantial reduction in our leakage account. We lost in round numbers $150,000 from that cause last year, and we hope to save approximately one-half of that amount during this one.

"We have already made an encouraging beginning, and having, for the first time in our history, an adequate provision in the shape of funds for this and other improvements, will go on systematically to protect the plant in that important particular.

"And this inadequately developed source of revenue consists in the use of slot meters by persons whose means are too limited to justify the installation of the regular type. Again, it only needs proper organization and financing to increase the demand for gas by furnishing to all who may apply, at attractive prices, all kinds of gas appliances, either for cash or on the installment plan. In this way we calculate to greatly increase our sales of gas this year and from now on. From all of which and other economies in sight we confidently hope to make you a year hence the most satisfactory showing in our history. According to our agreement with the Commissioners, as you, no doubt, understand, that showing will be submitted to them for verification; our books will be thrown open to them, and they will remain open thereafter, to analyze every item of cost in that statement and all subsequent ones, with a definite understanding that we will make such reductions, from time to time, as the facts thus shown may indicate to be reasonable and proper in the premises."

The annual reports showed many interesting figures and facts respecting the business of the Company for the twelvemonth, and a study of these goes to prove the statement frequently heard in gas circles that, relatively, the Washington Gas Company is the best revenue producing Gas Company in existence. Last year the total output for which the Company was paid amounted to 2,216,506,291 cubic feet, which was paid for at the average rate of 90½ cents per 1,000. Other sales revenue from products amounted to $80,221, of which $62,491 is credited to coke. The return on ammoniacal liquor account amounted to $3,497—which looks rather low. The gas sent out was a mixture of something like 65 per cent. water gas and 35 per cent. coal gas, and in the manufacture of the total volume these quantities of materials were used: Bituminous coal, 26,742 tons, anthracite, 33,824 tons; oil, 9,219,000 gallons; steam, 2,848 tons. The candle power averaged 23.01—report of official inspector. The consumers' meters in use number 52,202, and the sums given out on account of charitable purposes amounted to $1,100, to which should be added the sum of $4,351 bestowed on pensions and other "relief." The charge to depreciation is $73,000. And the value of plant (exclusive of working capital) of this well managed Company is set down as $12,502,000.

The "Honorable Mayor" of Haverhill, Mass.—Edwin H. Moulton—and his aides in the City Council, who are anxious to operate the local gas supply on mnnicipal account, and to which end it is necessary to acquire the plant of the Haverhill Gas Light Company, took (or tried to take) a step in that direction by securing counsel of sufficient knowledge and of accredited merit, to formulate the procedure. The Mayor's choice rested on Mr. George W. Anderson, of Boston, who was at once communicated with, asked to name terms, etc. Mr. Anderson named the sum of $150 per day and expenses, with the further expression of thought that, "There are plenty of lawyers at this bar who would name a higher figure," although "the work was interesting," and that he was "willing to undertake it on that basis." Perhaps, in this extremity, Mister Marks might be prevailed upon to assume the "duties." He would take less than $150 per; but, then, the difference between Anderson and Marks is decidedly marked.

The vacancy in the Board of Directors of the Baltimore Consolidated Gas and Electric Company occasioned by the death of the Hon. F. C. Latrobe, has been filled by the election of Mr. Jno. L. Bailey, who has been the Company's Treasurer since January 1, 1908. Prior to that time (from 1904) he was on the Company's auditing division.

Mr. F. M. Sackett, President of the Louisville (Ky.) Lighting Company, sailed for Europe, from New York, the morning of the 14th inst. He will remain abroad for 3 months or more, and is accompanied by Mrs. Sackett.

The Citizens Gas Company, of Indianapolis, Ind., has filed a petition with the State Railroad Commission, charging the Chicago, Indianapolis and Louisville, the Cincinnati, Hamilton and Dayton, the Indianapolis Union Belt, the Indianapolis Southern, the Big Four and the Vandalia Railroad systems, using incorrect figures to designate the weight of empty coke cars, and with exorbitant charges made for placing such cars on the Gas Company's scales for determining weights received.

Last year the Laclede Gas Light Company laid 18.95 miles of distributing pipe and connected up 3,370 services and added 7,411 new consumers. The Company will on April 1st put the rate at 80 cents per 1,000 cubic feet.

THE AMERICAN GAS LIGHT JOURNAL

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PROPRIETORS.

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ELBERT P. CALLENDER,
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MONDAY, FEBRUARY 20, 1911.

The Market for Gas Securities.

The trading in Consolidated during the week was much less in volume than was the case in recent weeks, and its general tone was not indicative of higher scales. In fact, the song was the other way. The opening to-day (Friday) was reported at 140⅞ to 141. There is continued evidence in the market of the withdrawal therefrom of what might be termed floating stock.

Brooklyn Union keeps on in the even tenor of its way, at 140 to 141. It would not be at all unlikely if the Company did before long do something for its shareholders in the way of an increased dividend. Lacledes are noticeably higher, while Peoples, of Chicago, despite all the political claptrap going on in that city, seems to have some vitality, as it certainly should, when one remembers the excellent showing recorded for the Company's work in 1910.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

FEBRUARY 20.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	140¾	141
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	2,000,000	1,000	102	103
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	2,500,000	100	155	165
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98¼	100¼
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	100	102
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	140	141
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	299,650	509	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	5/8	¾
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	50	60
Capital, Sacramento	500,000	50	—	85
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,000,000	1,000	104	105¼
Cincinnati Gas and Electric Co.	29,500,000	100	92	93
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	106½	—
Mortgages, 6's	3,600,000	-	89	100
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	976,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	3,500,000	—	102	105
Detroit City Gas Co.	6,580,000	—	—	50
" Prior Lien 5's	5,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	108	108½
Indianapolis	2,000,000	—	78	83
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	111¼	111¾
Preferred	2,500,006	100	94¾	102
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	400,000	1,000	106	108¾
Massachusetts Gas Companies, of Boston	25,000,000	100	92½	93
Preferred	25,000,000	100	95¾	96
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	106½	107
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	--
Consolidated 5's	2,000,000	—	104⅜	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	1,000,000	1,000	100	102
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	3,447,000	1,000	90	95
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	100	104
Washington (D. C.) Gas Co.	1,600,000	200	385	387½
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	361	—

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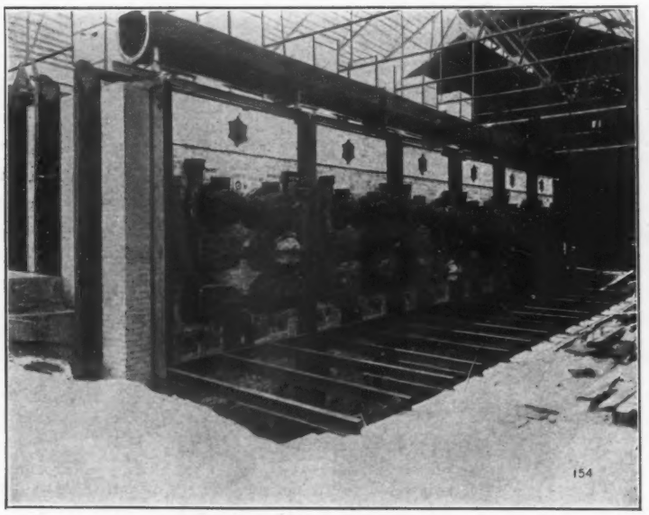

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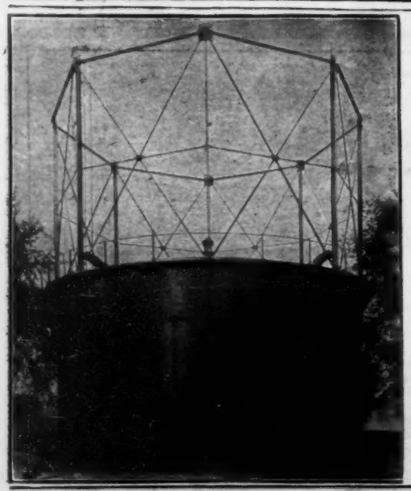

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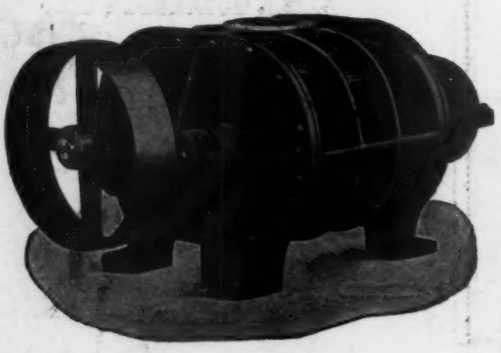

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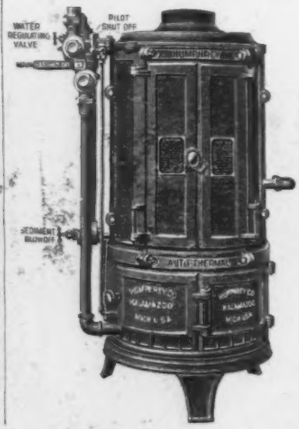

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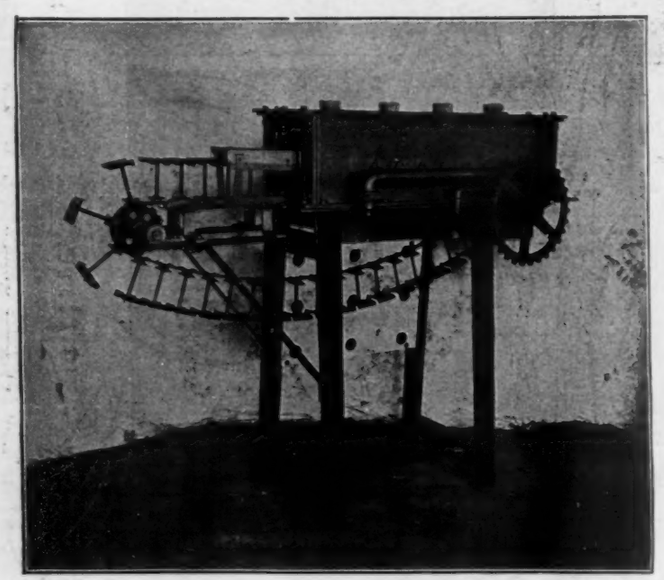

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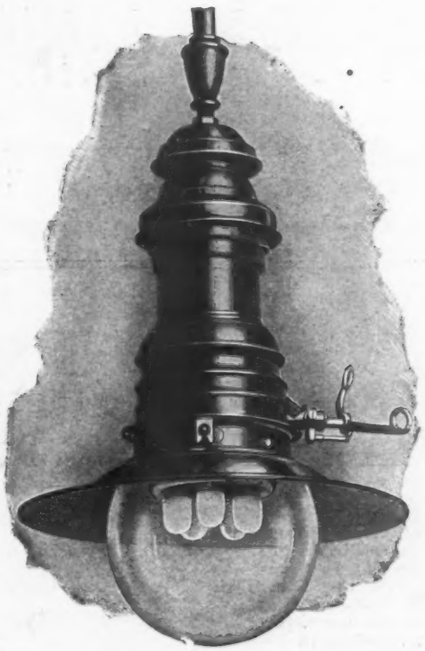

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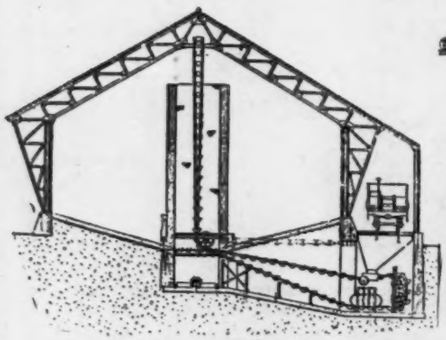

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American Gas Institute.—Annual meeting, October, 1911. St. Louis, Mo. Officers: President, Donald McDonald, Louisville, Ky. Secretary, A. B. Beadle, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting, June, 1911. ———. Officers President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, Nov., 1911. New York City. Officers: President, C. R. Huntley, Buffalo, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street, New York City.

Guild of Gas Managers of New England.—Annual meeting, December. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, A. K. Quinn; Newport, R. I.; Secretary, Walter G. Africa, Manchester, N. H.

Illinois Gas Association.—Annual meeting, time, March, Chicago, Ills. Officers: President, A. S. Harrington, Chicago, Ill.; Secretary-Treasurer, C. B. Strohn, Elgin, Ill.

Illuminating Engineering Society.—Annual meeting Oct. Chicago, Ill., 1911. Meetings of Sections, monthly. Pres't, A. E. Kennelly, Boston, Mass.; Secretary, Preston S. Millar, 29 W. 39th street, N. Y. City. Sections: New York: Secretary, Albert J. Marshall, 36 West 39th street. New England, Secretary, W. S. Farrow, 1290 Massachusetts avenue, Cambridge, Mass. Philadelphia, Secretary, G. B. Muth, 1000 Chestnut street Chicago, Secretary, F. H. Bernhard, Marquette Building.

Indiana Gas Association.—Annual meeting, Jan. 17 and 18, 1912, Indianapolis. Officers: President, S. E. Mulholland, Fort Wayne; Vice-President, Howard L. Olds, Indianapolis; Secretary-Treasurer, Philmer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, time, June, 1911, ———. Officers: President, Austin Burt, Waterloo, Ia.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, ——— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association—Annual meeting, time, Sept. 20, 21, 22, 1911; Detroit, Mich. Officers: President, A. P. Ewing, Detroit, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April 13, 14 and 15, 1911; St. Louis, Mo. Officers: President, R. J. Irvine; Secretary and Treasurer, W. J. Cunningham, Springfield, Mo.

National Commercial Gas Association.—Annual meeting, December 5-12, 1911. Denver, Officers: President, C. N. Stannard, Denver; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May 16, 17 and 18, 1911; Pittsburgh, Pa. Officers: President, John M. Garard, Columbus, O. Secretary, T. C. Jones, Delaware, O. Editor Wrinkle Department, F. W. Stone, Ashtabula, O.

New England Gas Association.—Annual meeting, third Wednesday in February, 1911; Boston. Officers: President, W. H. Snow, Holyoke, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

Oklahoma Public Utilities Association.—Annual meeting, May 9, 10 and 11, 1911. Officers: President, E. C. Reynolds; Secretary, Galen Crow, Guthrie, Okla.

Pacific Coast Gas Association.—Annual meeting, Sept. 20, 21 and 22, 1911, Oakland, Cal. Officers: President, F. A. Leach, Jr., Oakland, Cal.; Vice-President, W. Baurhyte, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April, 1911, Reading, Pa. Officers President, J. H. Keppelman, Reading, Pa.; Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, December, 1911; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, Waterbury, Conn.

Southern Gas Association.—Annual meeting, April 19-21, 1911, Montgomery, Ala. Officers: President, H. W. Frund, Salisbury, N. C.; Secretary-Treasurer, Jas. Ferrier, Rome, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. April 27, 28, 29, 1911; Houston, Tex. Officers: President, W. B. Tuttle, San Antonio, Tex.; Secretary, D. G. Fisher, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May ———, 1911, Milwaukee, Wis. Officers: President, W. H. Winslow, Superior, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.

Directory of American Gas Companies, 1910. Price, $5.00. For Sale by American Gas Light Journal, 42 Pine St. N. Y. City.

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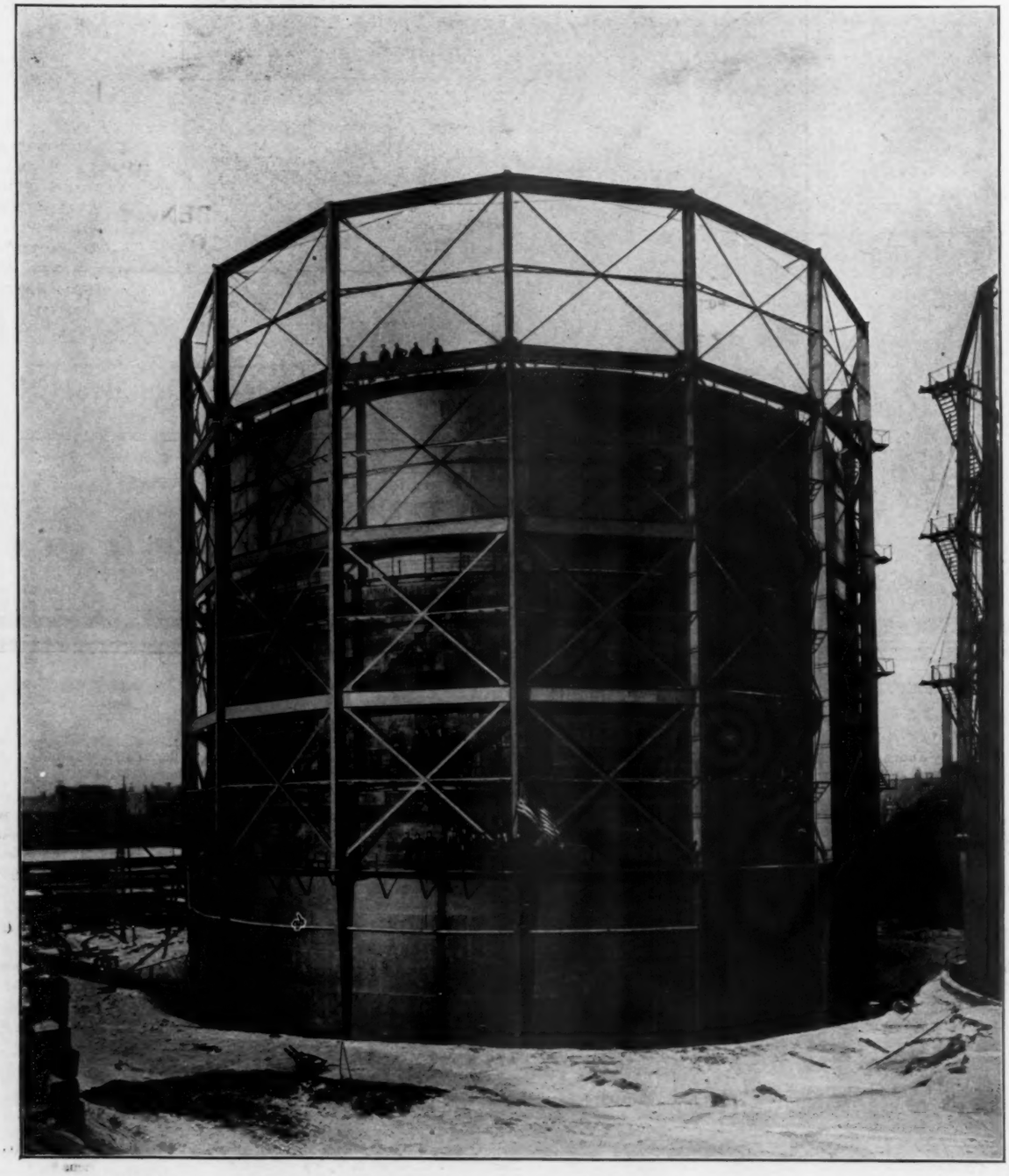

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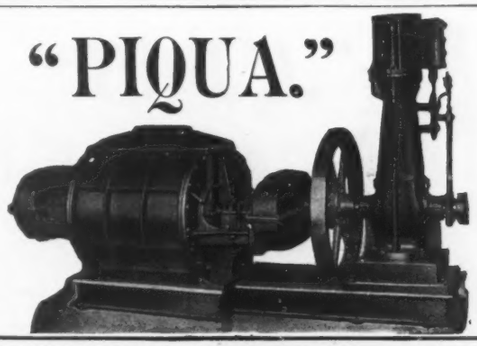

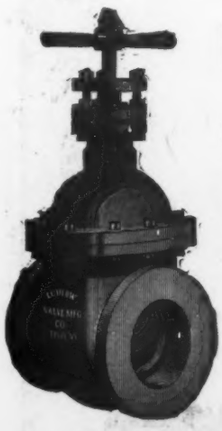

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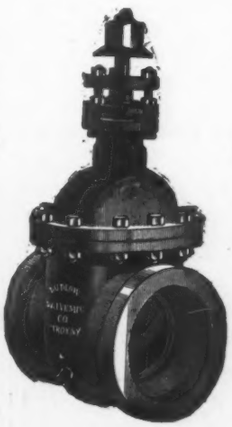

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For all ranges of temperature. Particularly advantageous to Progressive Gas Works. :: :: :: ::

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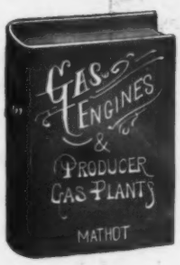
By R. MATHOT, M.E.,

Containing a Preface by DUGALD CLERK, F.C.S., Indorsing the Book.



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The INTERIOR has exclusive features that merit the attention of every gas company desiring an efficient and economical meter.

DRAKES
LIMITED,
HALIFAX ENGLAND.

GAS ENGINEERS
AND CONTRACTORS.

PUBLIC LIGHTING TABLE FOR FEBRUARY, 1911.

[Communicated by The American Meter Company.]

Day of Week.	MOONLIGHT SCHEDULE.		
	Date.	Light.	Extinguish.
Wednesday	1	5.50 P.M.	6.10 A.M.
Thursday	2	5.50	6.10
Friday	3	9.00	6.10
Saturday	4	10.10	6.10
Sunday	5	11.20	6.00
Monday	6	12.40 A.M. F.Q.	6.00
Tuesday	7	1.50	6.00
Wednesday	8	3.10	6.00
Thursday	9	4.10	6.00
Friday	10	5.10	6.00
Saturday	11	No L.	No L.
Sunday	12	No L. F.M.	No L.
Monday	13	No L.	No L.
Tuesday	14	6.00 P.M.	8.00 P.M.
Wednesday	15	6.00	9.10
Thursday	16	6.00	10.10
Friday	17	6.00	11.20
Saturday	18	6.00	12.20 A.M.
Sunday	19	6.10	1.20
Monday	20	6.10 L.Q.	2.20
Tuesday	21	6.10	3.20
Wednesday	22	6.10	4.20
Thursday	23	6.10	5.10
Friday	24	6.10	5.40
Saturday	25	6.10	5.40
Sunday	26	6.20	5.40
Monday	27	6.20	5.40
Tuesday	28	6.20 N.M.	5.40

THE NEW MODEL PREPAYMENT METER.

SEND FOR SAMPLE METER AND LET US SHOW YOU THE NEW IMPROVEMENTS.

NEW YORK IMPROVED METER CO.,

306-310 EAST 47TH ST., NEW YORK CITY.

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INVERTED GAS ARC LAMP.

YOU WHO ARE LOOKING FOR GOOD THINGS NOTE SOME OF THE EXCEPTIONAL FEATURES OF THIS LAMP.

The Ventilator is made in two vertical hinged sections which may be easily opened, removed if desired, and locked automatically.

The Valve may be removed for cleaning by loosening ONE set screw and turning a hexagon nut. No Springs to get out of order.

All working parts accessible, removable and interchangeable, even while lamp is in operation.

Each Burner has a Separate Gas Adjustment which may be locked after correct incandescence is obtained.

Mantles are suspended in a Plate which raises and lowers on two guide rods—No Jar—No Warping—Great Saving in Maintenance Costs.

Porcelain Burner Noses are held firmly in position by German Silver Cap.

Best Material. Skilled Workmanship. Every Lamp guaranteed mechanically perfect.

A LABOR SAVER. A LIGHT GIVER. A PRICE SATISFIER.

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AMERICAN GAS LIGHT COMPANY,

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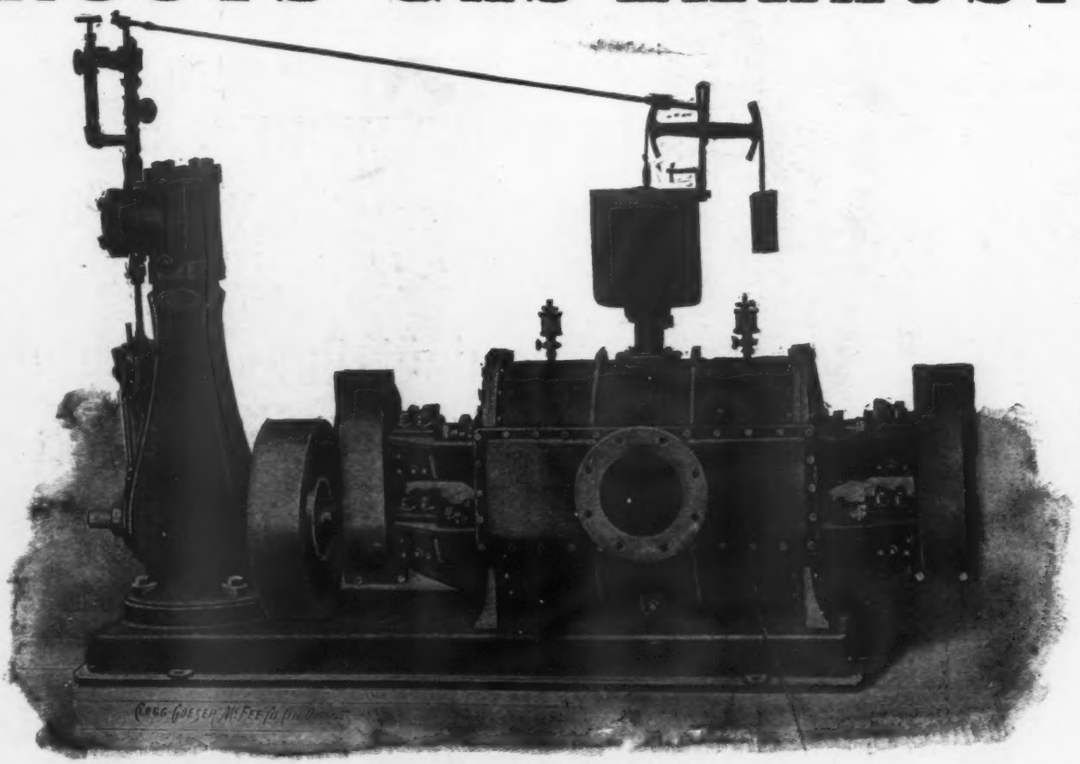
ROOTS' GAS EXHAUSTERS.



Sizes for any required capacity.

Self-oiling, adjustable bronze bearings.

Most perfect and sensitive Governor.

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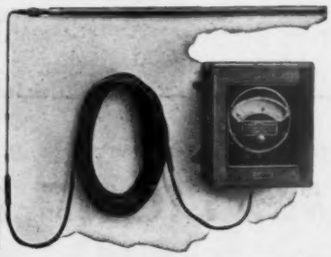

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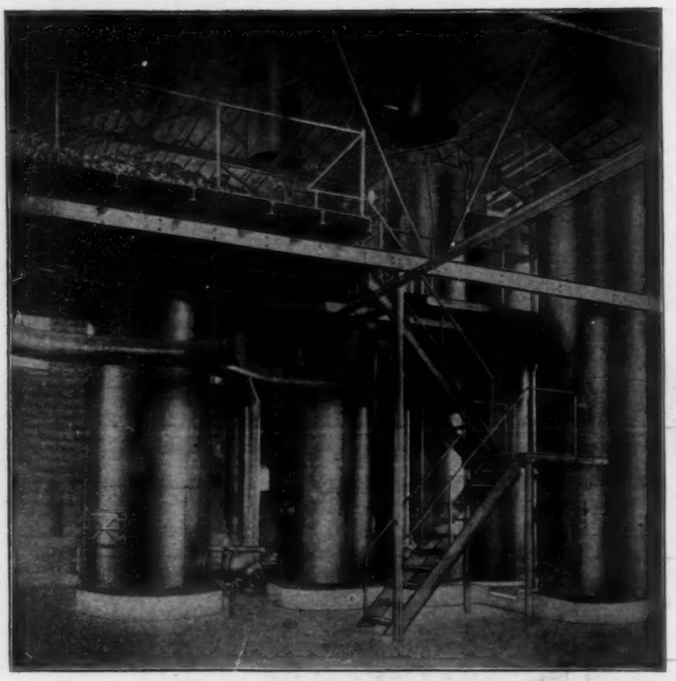

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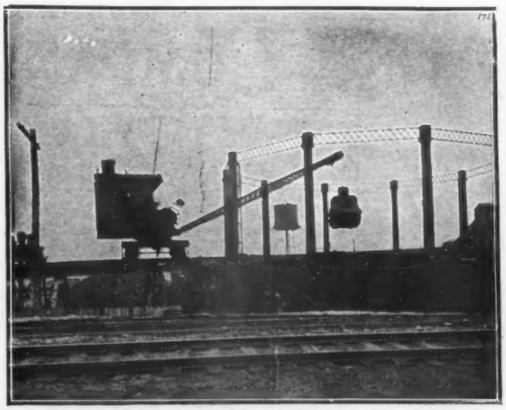

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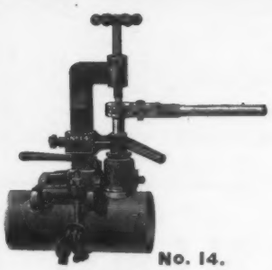
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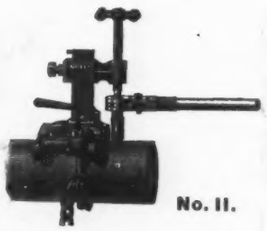
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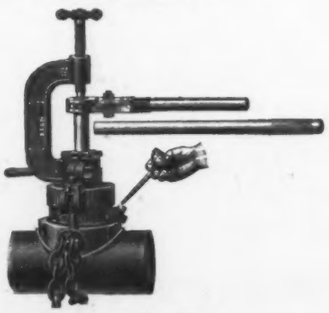
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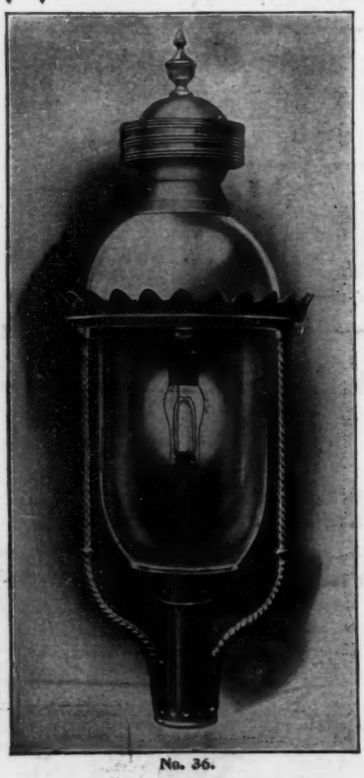

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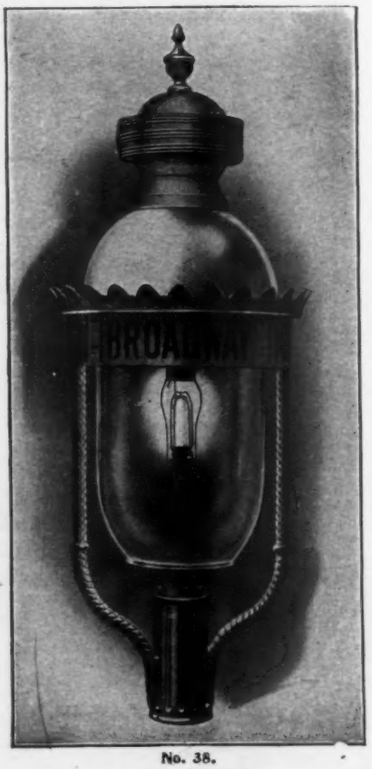

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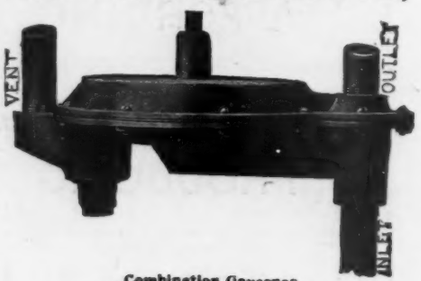

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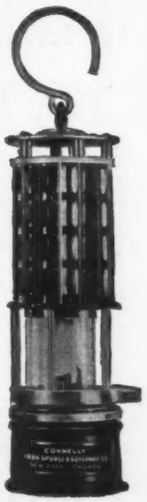

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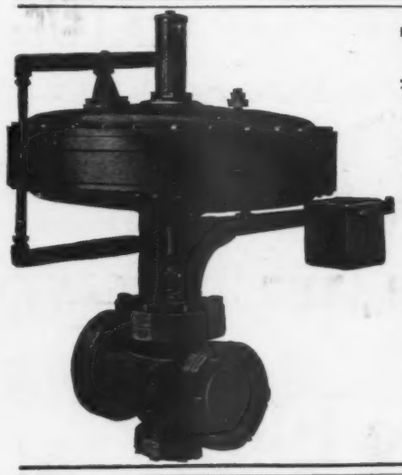

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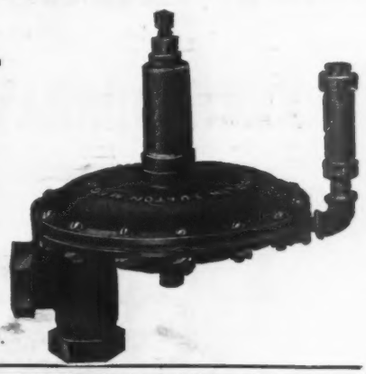

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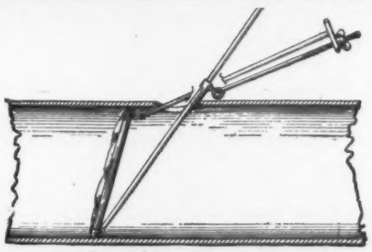

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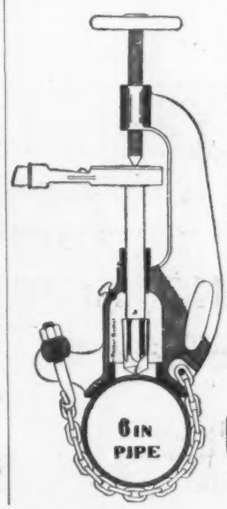

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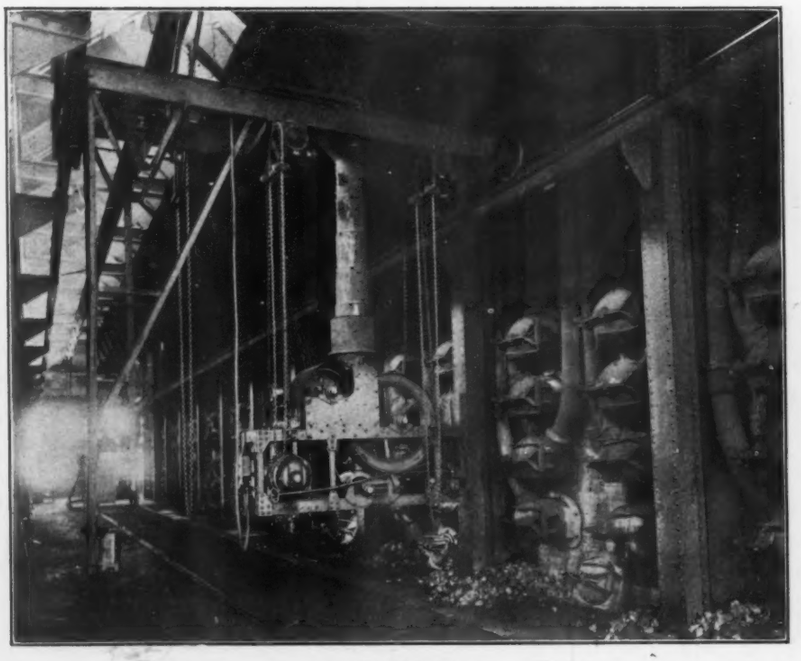

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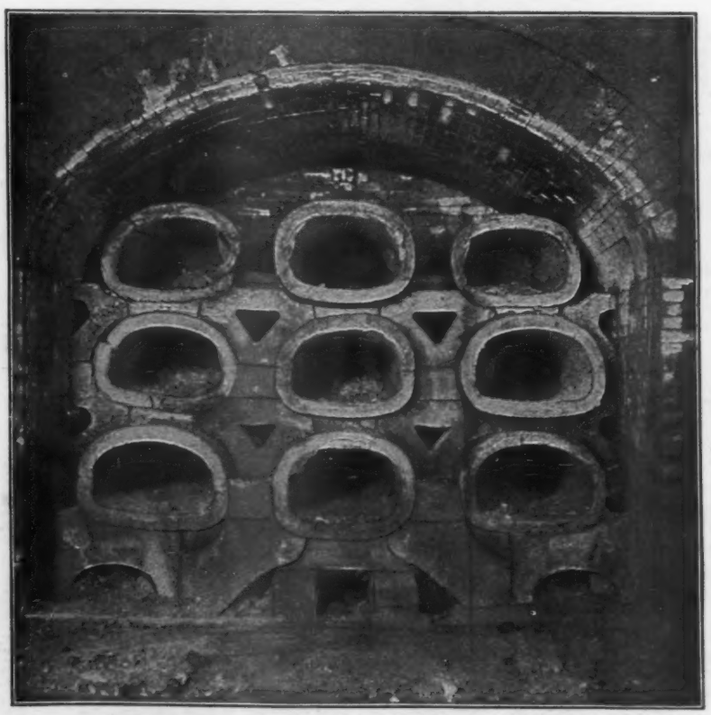

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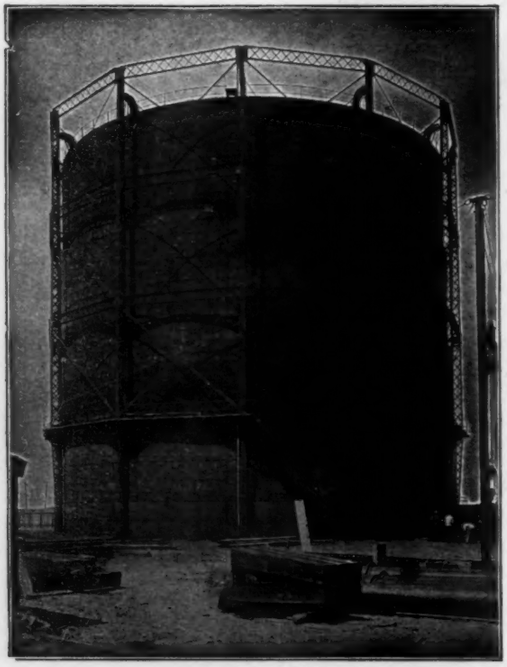

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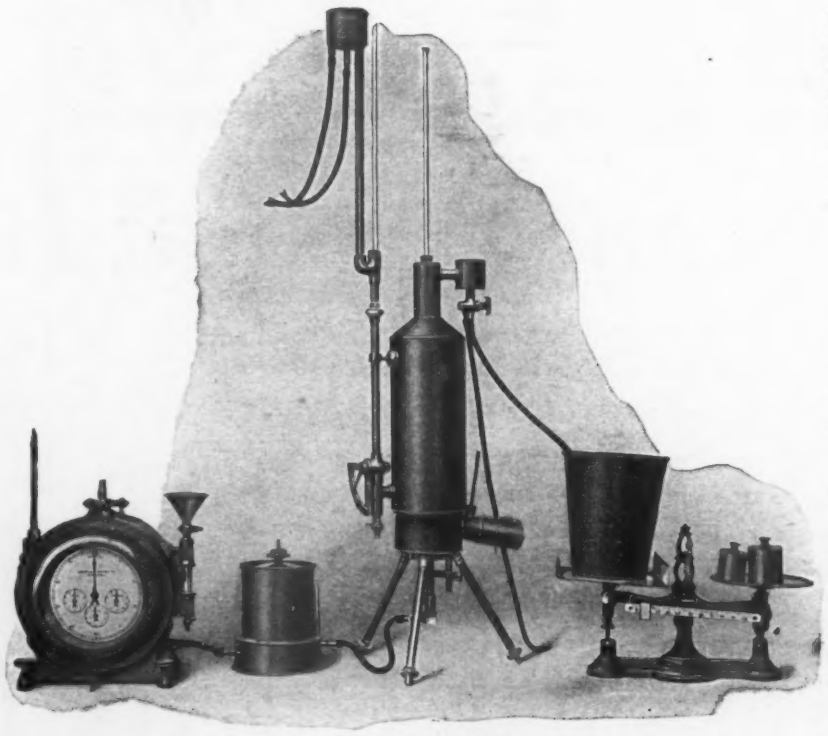

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